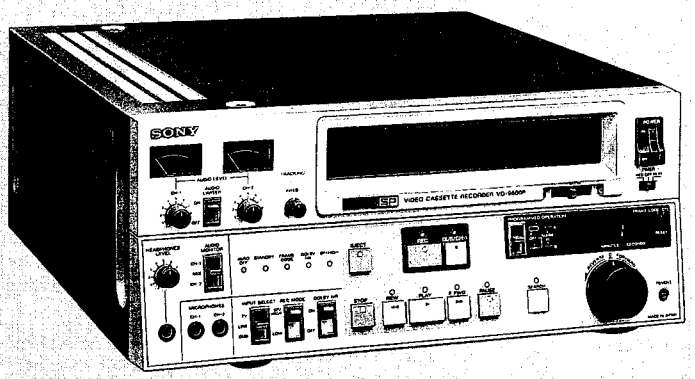
U-matic SP

VIDEOCASSETTE RECORDER

VO-9600P

VOL-1



SONY

SERVICE MANUAL

SPECIFICATIONS

System

Recording system: Rotary 2-head helical scan
- Luminance: fm recording
- Color signal: converted subcarrier direct recording

Video signal system
- CCIR standards, PAL color

Video

Inputs:
- VIDEO IN (BNC type) ×1
  - 1.0 Vp-p ±0.3 Vp-p, 75 ohms, unbalanced sync negative
- DUB IN (7-pin) ×1
- TV (8-pin) ×1

Outputs:
- VIDEO OUT 1, 2 (BNC type) ×1 each
  - 1.0 Vp-p ±0.2 Vp-p, 75 ohms, unbalanced sync negative
- DUB OUT (7-pin) ×1
- TV (8-pin) ×1

Horizontal resolution
- SP mode recording: 300 lines (both B/W and color)
- High-band recording: 260 lines (both B/W and color)
- Low-band recording: 250 lines (both B/W and color)

S/N:
- Color: more than 46 dB
- Luminance (Y): more than 48 dB

Sync signal input:
- SYNC IN (BNC type) ×1
  - 2.5 Vp-p (2 to 5 Vp-p), 75 ohms, unbalanced
- RF OUT (OFF TAPE) ×1
  - 0.5 (0.3 to 1.0) ±0.1 Vp-p, 75 ohms, unbalanced

Recording level control
- Automatic

Audio

Inputs:
- AUDIO LINE IN CH-1/L, CH-2/R (XLR 3-pin female) ×1 each
  - +4 dB, 10 k ohms, balanced
- MICROPHONE CH-1/L, CH-2/R (phone jack) ×1 each
  - −60 dB, 3 k ohms, unbalanced
- TV (8-pin) ×1

Outputs:
- AUDIO LINE OUT CH-1/L, CH-2/R (XLR 3-pin male) ×1 each
  - +4 dB (at 600 ohm load), balanced
- AUDIO MONITOR (phono jack) ×1
  - −5 dB (at 47 k ohm load)
- TV (8 pin) ×1
- HEADPHONES (stereo phone jack)
  - For 8-ohm headphones
  - Level adjustable (from −26 to −46 dB)

S/N:
- With Dolby NR off
- 52 dB (KSP, KSP-S tapes)
- 50 dB (KCA, KCS tapes)
- (both channel 1 and 2 at 3% distortion)

Frequency response: 50 to 15,000Hz (both audio channel 1 and 2 with Dolby NR off)

Recording level control
- Manual or limiter selectable

Other functions

Memory backup of programmed operation
- 3 years from shipment

Pause:
- A still picture is obtained with long pause function

Search:
- Still, 1/30 to 5 times normal speed in both forward and reverse directions
- With RM-580 and RM-500: picture serach with 8 times normal speed (both KSP and KSP-S tapes)

Tracking control: Possible

Skew control: Possible

Sync system:
- Automatic switching between internal and external

Dropout compensator
- Built-in

Tape transport

Tape speed: 95.3 mm/sec.

Recording and playback time
- Approx. 60 minutes (with KSP-60)

Fast forward and rewind time
- Within 4 minutes (with KSP-60)

Wow and flutter: Less than ±0.23% p-p (DIN)

Tape compatibility
- U-matic video cassette tapes

Usable tapes: KSP, KSP-S, KCA, KCS type

General

Power requirements
- 198 - 264 V AC, 48 - 64 Hz

Power consumption
- 70 W (with the RM-580 and RFK-634)

Operating position: Horizontal

Storage temperature
- −20°C to +60°C (−4°F to +140°F)

Operating temperature
- 5°C to 40°C (41°F to 104°F)

Dimensions:
- 424 × 192 × 492 mM (w/h/d)
- (16 3/4 × 7 5/8 × 19 3/8 inches)
- including projecting parts and controls

Weight: Approx. 18 kg (39 lb 11 oz)

Supplied accessories
- Operating instructions (1)
- RF modulator compartment cover (1)
- AC power cord (1)

Optional accessories

BKU-701 computer interface board
FCG-700 frame code generator
RX-707 auto search control unit (for RS-232C interface)
RX-353CE, RX-303CE auto search control unit (for 33-pin interface)
RM-690 remote control unit (for REMOTE connector)
RM-580, RM-500 remote control unit (for 33-pin interface)
RFK-660UCE/660UB/660UF/660CH RF kit
RMM-507 rack mount kit
RM-555 multi remote control unit

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15. SPARE PARTS AND FIXTURE

SECTION 1
GENERAL DESCRIPTION

1-1. FEATURES

High-quality picture with a new recording/playback system

Recording and playback using the newly developed SP (Superior Performance) system and SP tapes specially designed for the SP system, provide clearer and sharper pictures than before.

Three mode recording/playback

The VO-9600P is capable of recording and playback in the modes of SP, high-band and low-band. So with the VO-9600P, you can get the tape which can be played back in any desired mode.

Hi-Fi sound

Dolby NR C type noise reduction system permits high-performance audio recording/playback with reduced noise (with Dolby NR on. S/N 70dB with KSP or KSP-S tape). Cannon 3-pin connectors usually used for professional audio equipment are employed for the audio inputs and outputs.

Remote control using 33-pin connector

The VO-9600P is equipped with the 33-pin remote control connector, and can be controlled with an optional remote control unit such as the RM-500, RM-580. Any point can be searched for and be played back automatically usning an RX-353CE or RX-303CE auto search control unit.

Dubbing connectors for high quality picture duplication

The DUB IN and DUB OUT connectors allow to duplicate the picture with minimum picture quality deterioration.

RS-232C interface

A simple circuit board replacement provides an RS-232C interface, which permits remote control operations from an optional search control unit, such as the Sony RX-707, or a computing device with an RS-232C interface capability.

Search operation

Governed by the search dial, playback pictures can be viewed at various speeds from 1/30 times to 5 times normal speed as well as in a still mode. As the playback can be performed in both forward and reverse directions, any desired scene can be easily found.

LED time counter

The time counter reads out the CTL signals recorded on a tape and the LEDs indicate the tape running time in seconds and minutes. These are useful to check the recording time of a material and the remaining time of a tape.
When a tape on which frame codes have been recorded is played with an optional BKU-701 computer interface board attached to this unit, the time counter shows the current tape position in frame codes (absolute address).

Programmed operation

Programmed operation allows you to easily locate a desired point on a tape and also to repeatedly play back a desired portion.

Connection of a time base corrector

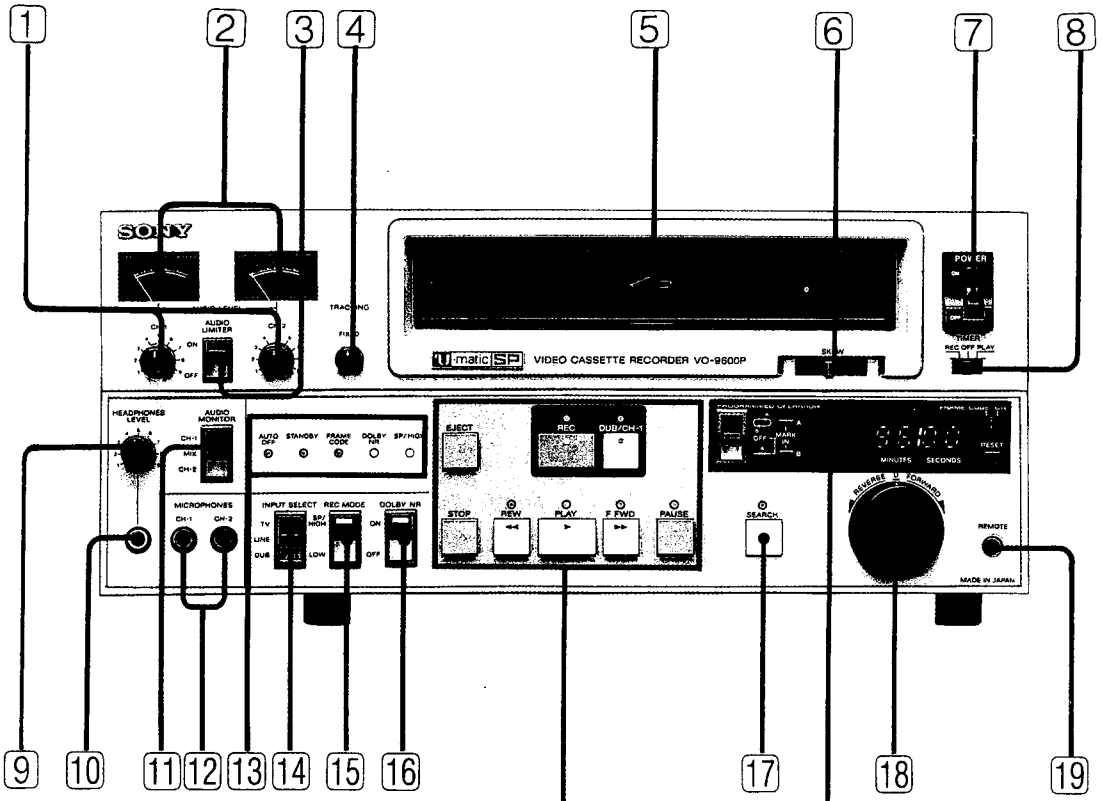
The best possible playback picture will be obtained by connecting a time base corrector.

Automatic control of video recording level

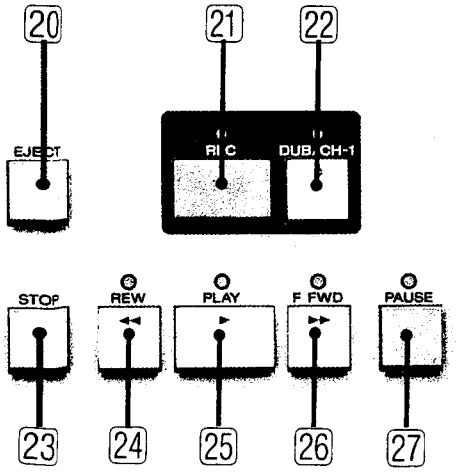
The automatic gain control (AGC) circuit maintains the proper video level assuring optimum video recording.

1-2. LOCATION OF PARTS AND CONTROLS

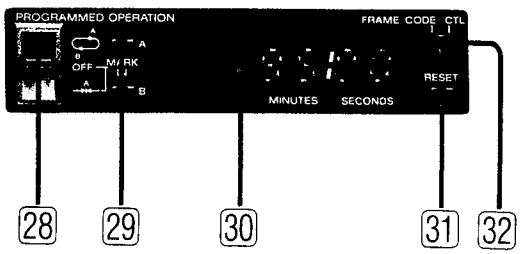
FRONT PANEL



Function buttons



Memory counter section



[1] AUDIO LEVEL controls

[2] Audio level meters
Audio recording level is shown in recording and audio playback level in playback.

[3] AUDIO LIMITER switch

ON	The audio recording limiter circuit is activated to minimize sudden surges of input signals and perform recording with low sound distortion. Microphone recordings shall be performed with this setting.
OFF	The limiter circuit is deactivated, enabling a manual recording level adjustment.

[4] TRACKING control
Normally set this control at the center FIXED position. Should noise, snow or streaks appear in a playback picture recorded on another machine, turn this control so that the best possible picture is obtained.
- Do not move this control from the center FIXED position while recording.

[5] Cassette compartment

[6] SKEW lever
Normally set this lever at the center position.
When "hooking" distortion appears in the upper part of a playback picture, slide this lever to the right or left to obtain a normal picture.
- Do not move this lever while recording.

[7] POWER switch

[8] TIMER switch
For automatic recording and playback using an optional timer.
Set this switch to OFF when no timer is used.

[9] HEADPHONES LEVEL control

[10] HEADPHONES connector (stereo phone jack)

[11] AUDIO MONITOR switch
Select the sound to be monitored through headphones or a speaker of a video monitor.

[12] MICROPHONES CH-1 and CH-2 connectors (phone jacks)

[13] Indicator section

AUTO OFF	Lights at power-on when moisture is condensed inside the unit. While this indicator is lit, any cassette cannot be loaded.
STANDBY	Lights while a tape is being threaded from or unthreaded to the cassette inside the unit.
FRAME CODE	Lights when a tape on which frame codes have been recorded is played back or when a video signal with frame codes is in an E-to-E mode, with a BKU-701 attach J to this unit.
DOLBY NR*	In recording: Lights when an SP series cassette is inserted with the DOLBY NR switch set at ON. In playback: Lights when a tape recorded with the Dolby NR system is played.
SP/HIGH	In recording: Lights when the recording is performed in SP or high-band mode. In playback: Lights when a tape recorded in SP or high-band mode is played back.

* When the power is turned on with the DOLBY NR switch set at ON and the REC MODE switch is set of SP/HIGH, the DOLBY NR lamp lights up even if no cassette has been inserted.

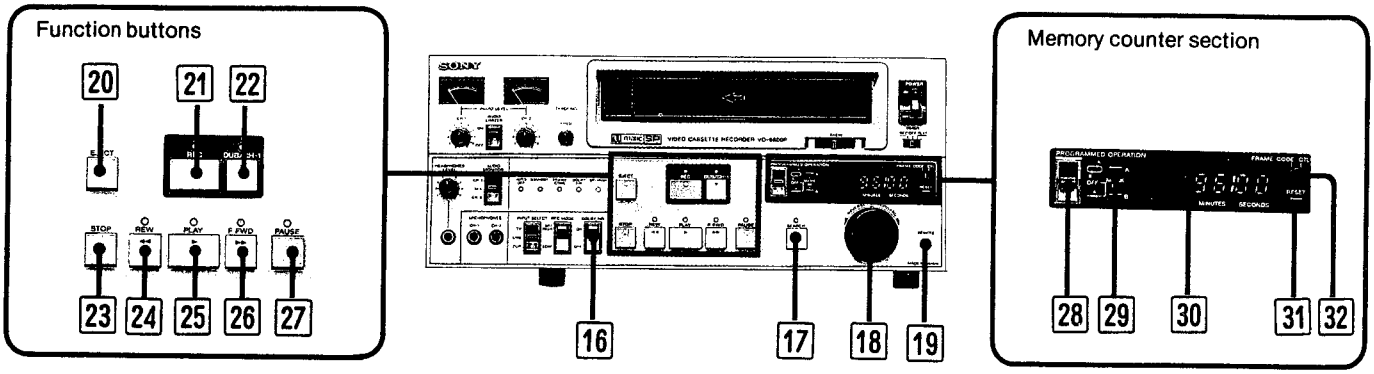
[14] INPUT SELECT switch
Select a signal to be recorded.

TV	When recording a signal connected to the 8-pin TV connector.
LINE	When recording a signal connected to the BNC type VIDEO IN and the XLR 3-pin AUDIO IN connectors.
DUB	When recording a signal connected to the DUB IN and the AUDIO IN connectors.

[15] REC MODE switch
When the signal connected to the BNC-type VIDEO IN or 8-pin TV connector is to be recorded, select the recording mode.

SP/HIGH	**When the SP series cassette is used,** the recording is performed in the SP mode. **When the conventional cassette is used,** the recording is performed in the high-band mode.
LOW	The recording is performed in the low-band mode on both the SP series and conventional cassettes.

- This switch does not function when the INPUT SELECT switch is set to DUB.



16 DOLBY NR (noise reduction) switch
When an SP series tape is used for recording and the REC MODE switch is set to SP/HIGH, set this switch to;

ON	For recording the sound with the Dolby NR system.
OFF	For recording the sound without the Dolby NR system.

- This switch has no effect in playback mode. The circuit is automatically switched by detecting whether the tape being played has been recorded with the Dolby NR system or not.
- The Dolby NR system is effective only for recording on SP series cassettes. This switch is not operative when recording on KCA and KCS cassettes.

17 SEARCH button/lamp
Press to engage the search dial. The lamp will light.

18 Search dial
By turning this dial with the SEARCH button depressed, the playback speed can be varied from 1/30 to 5 (1/30, 1/10, 1/5, 1/2, 1, 2, and 5) times normal speed. Clockwise rotation (to FORWARD) makes the tape run forwards and counterclockwise rotation (to REVERSE) makes it run backwards. At the center "0" position, the picture will be still.

19 REMOTE connector(special minijack)
Accepts an optional RM-690 remote control unit. Recording, playback, fast forward, rewind and search (with 5 times speed) operations can be remotely controlled.

Function buttons

20 EJECT ⏏ button

21 REC ● (recording) button/lamp
For recording, press this button simultaneously with the PLAY ▶ button.

22 DUB/CH-1 ⊖ (audio dubbing) button/lamp
For adding sound to a tape on which video signal has been previously recorded, press this button simultaneously with the PLAY ▶ button. The sound will be recorded on audio channel 1.

23 STOP ■ button

24 REW ◀◀ (rewind) button/lamp

25 PLAY ▶ (playback) button/lamp

26 F FWD ▶▶ (fast forward) button/lamp

27 PAUSE ❚❚ button/lamp

Memory counter section

28 PROGRAMMED OPERATION switch

A B	For repeatedly playing a particular portion or for checking the point memorized by the MARK IN A and B buttons.
OFF	For normal operation without using any programmed operation. (When the unit is to be controlled from a remote control unit connected to the REMOTE connector, be sure to set this switch to OFF.) Or for memorizing points on the MARK IN A and B buttons for a programmed operation.
A	For locating a point memorized with the MARK IN A button. • If no point is memorized, the tape stops at the point indicated by "0" on the time counter.

[29] MARK IN A and B buttons

Press to memorize the time counter value at that point. You can memorize only one point on each button. If the button is pressed several times, only the last point will be memorized.

When a tape on which frame codes have been recorded is used with an optional BKU-701 attached to this unit, two kinds of data, one CTL and one frame code, can be memorized on each button by changing the FRAME CODE/CTL switch setting.

[31] RESET button

This button has the following three functions.

Clearing the time counter indication

The time counter indication will be set to "0" when this button is pressed.

When a BKU-701 is attached, the time counter indication will be set to "0" when this button is pressed with the FRAME CODE/CTL switch set at CTL.

Clearing the memorys on the MARK IN A and B buttons

When the PROGRAMMED OPERATION switch is set at OFF or →|←, the points memorized by the MARK IN A and B buttons will be cleared and "0" will be memorized on both buttons, when the RESET button is pressed.

When the BKU-701 is attached, perform this operation after setting the FRAME CODE/CTL switch to CTL.

Displaying the rotation time of the head drum

When this button is kept pressed for more than 2 seconds with the PROGRAMMED OPERATION switch set at A/B, the duration of the head drum rotation will be indicated in fifties of hours on the time counter.

[30] Time counter

[32] FRAME CODE/CTL switch

Selects the time counter indication. See below.

When no BKU-701 is attached

In recording and playback

FRAME CODE/CTL switch setting	Time counter indication
CTL	Tape running time in seconds and minutes (Relative address indication)
FRAME CODE	

When a BKU-701 is attached

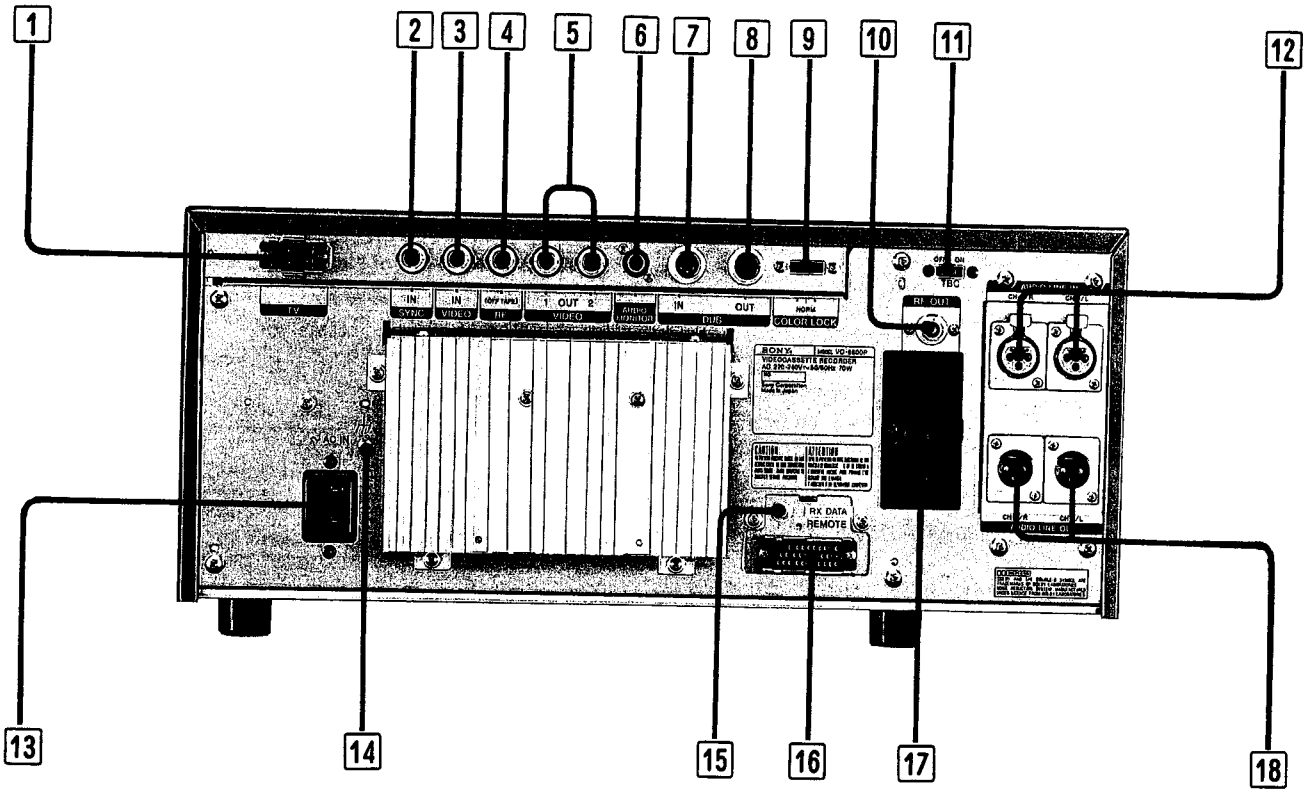
In recording and playback of the video signal in which frame codes have been inserted

FRAME CODE/CTL switch setting	Time counter indication
FRAME CODE	Frame code numbers (Absolute address indication)
CTL	Tape running time in seconds and minutes (Relative address indication)

In recording and playback of the video signal in which no frame code has been inserted

FRAME CODE/CTL switch setting	Time counter indication
FRAME CODE	Frame numbers obtained by counting and converting the CTL signals
CTL	Tape running time in seconds and minutes

REAR PANEL


1
2
3
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9
10
11
12
13
14
15
16
17
18
TV
IN SYNC
IN VIDEO
OUT VIDEO
IN DUB
OUT
COLOR LOCK
RX DATA
REMOTE
TBC
RS-232C
AUDIO LINE OUT

[1] TV (monitor) connector (8-pin connector)*
Accepts a video monitor having an 8-pin VTR connector. All the VIDEO IN, VIDEO OUT, AUDIO LINE IN and AUDIO LINE OUT connections can be replaced with a single cable connection here. When this connector is used, audio signal will be recorded on audio channe! 2 only. In playback, the channel selected by the AUDIO MONITOR switch will be heard through the speaker on the video monitor.

[2] SYNC IN (sync signal input) connector (BNC type)
Accepts an external sync signal to operate the unit in syncronization with an external device (time base corrector, etc.).

[3] VIDEO IN connector (BNC type)*

[4] RF (OFF TAPE) output connector (BNC type)
Supplies an FM signal to a time base corrector in playback.

[5] VIDEO OUT 1 and 2 connectors (BNC type)

[6] AUDIO MONITOR output connector (phono jack)
Supplies an audio signal selected at the AUDIO MONITOR switch on the front panel.

[7] DUB IN connector (7 pin)**
When duplicating a tape using a player with a dubbing connector, the video signal is connected using this connector.
- The recording mode is automatically selected by the input signal and the type of used cassette. For details, refer to "RECORDING".

[8] DUB OUT connector (7 pin)**
When duplicating a tape using a recorder with a dubbing connector, the video signal is connected using this connector.

[9] COLOR LOCK switch
As a rule, set to NORMAL. If the playback picture has no color or if the hue is abnormal, set the switch to the upper or lower position marked [•].

[10] RF OUT connector (DIN type)
Feeds out video and audio signals as a modulated TV signal. Connect it to the antenna terminal of a TV receiver.

[11] TBC (time base corrector) switch

ON	For playback using a time base corrector.
OFF	For playback without using a time base corrector.

[12] AUDIO LINE IN CH-1/L and CH-2/R connectors (XLR 3-pin, female)

[13] AC IN connector

[14] Ground terminal

[15] RX DATA connector (minijack)
For recording data or reading recorded data by an RX-353CE or RX-303CE auto search control unit.

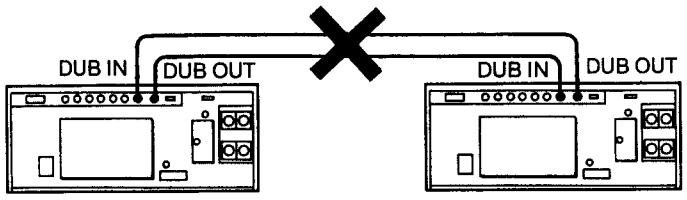
[16] REMOTE connector (33-pin)
Connect an optional editing control unit, auto search control unit, or remote control unit to remotely control the recorder.
- Before connecting a remote control cable, check whether the connector is male or female.
- A 20-pin connector can also be connected without using any plug adaptor.

[17] RF modulator compartment
Insert an optional RF modulator here to monitor playback picture and sound on a TV receiver. (A compartment cover is supplied with this unit.)
- An RF modulator converts the video and audio signals read out from a tape into a TV signal.

[18] AUDIO LINE OUT CH-1/L and CH-2/R connectors (XLR 3-pin male)

* The recording mode of the signals connected to the TV or VIDEO IN connector is decided by the setting of the REC MODE switch and the type of cassette to be used.

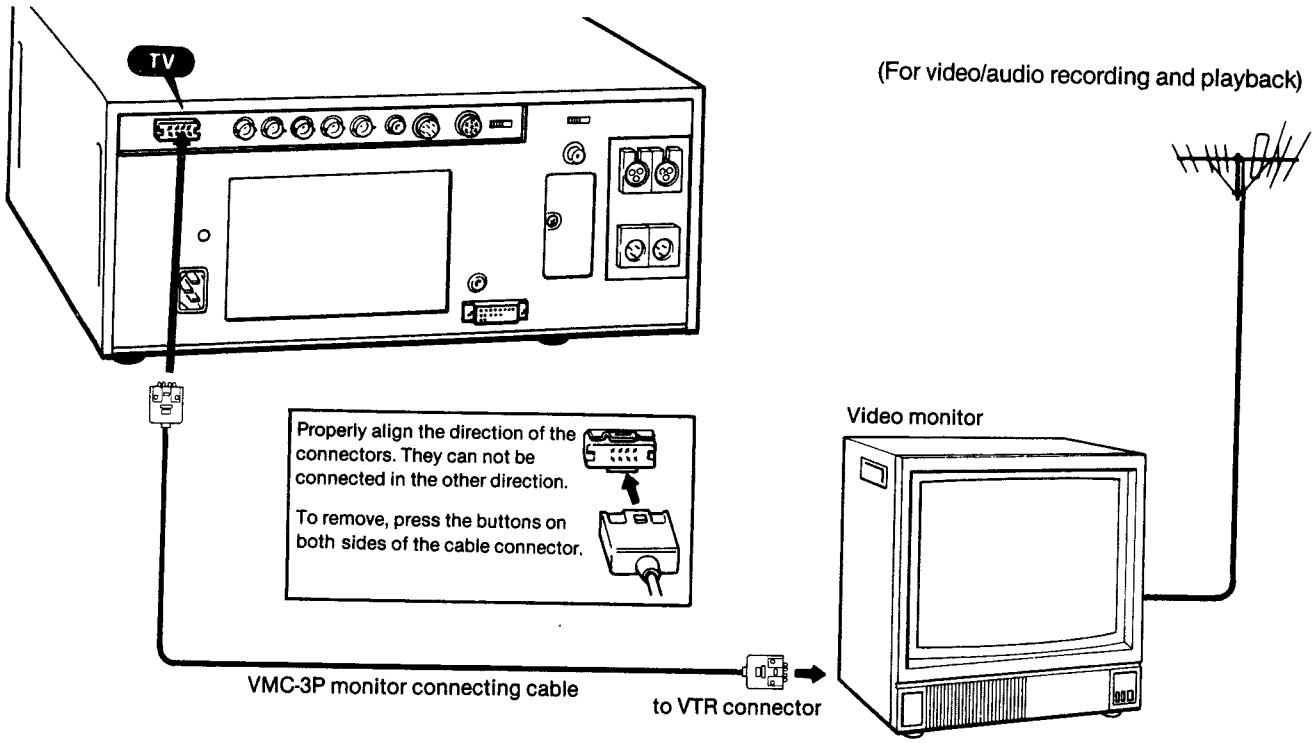
****Note on DUB connectors**
Do not connect the dubbing connectors in parallel.



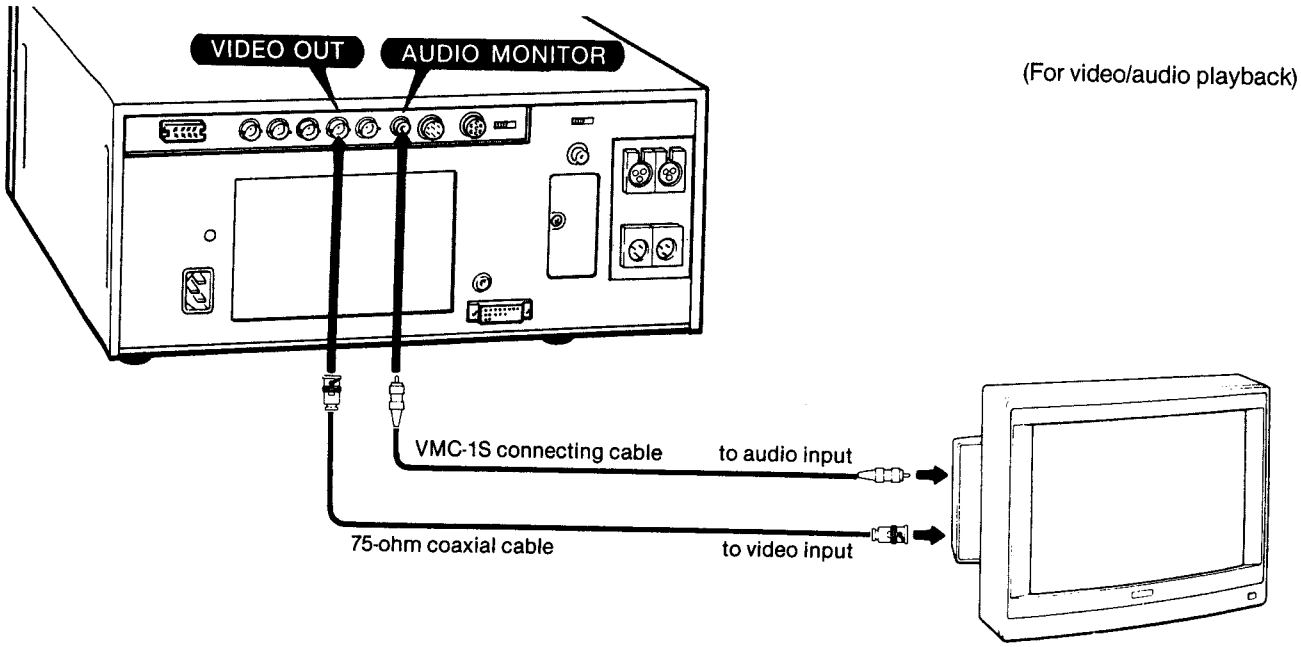
1-3. CONNECTION

1-3-1. Connection to a Video Monitor

FOR CONNECTING A VIDEO MONITOR WITH AN 8-PIN VTR CONNECTOR

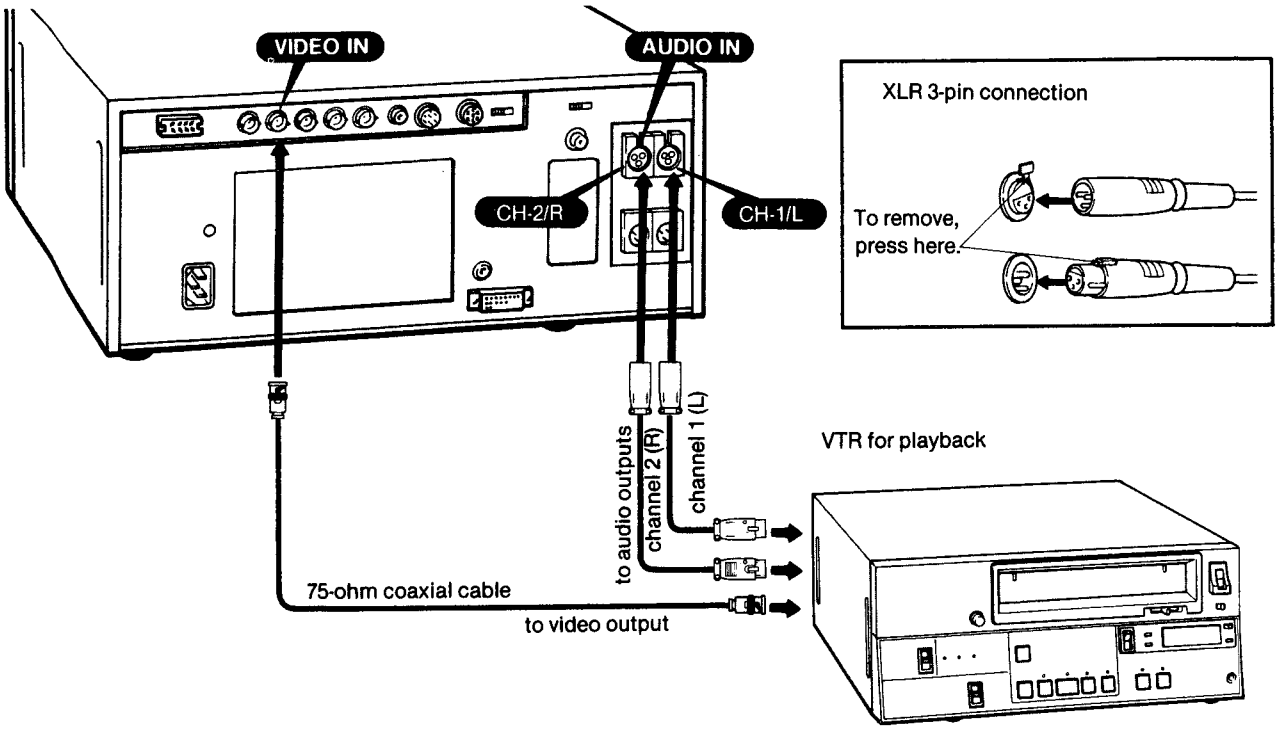

TV
(For video/audio recording and playback)
Properly align the direction of the connectors. They can not be connected in the other direction.
To remove, press the buttons on both sides of the cable connector.
Video monitor
VMC-3P monitor connecting cable
to VTR connector

FOR CONNECTING A VIDEO MONITOR NOT HAVING AN 8-PIN VTR CONNECTOR

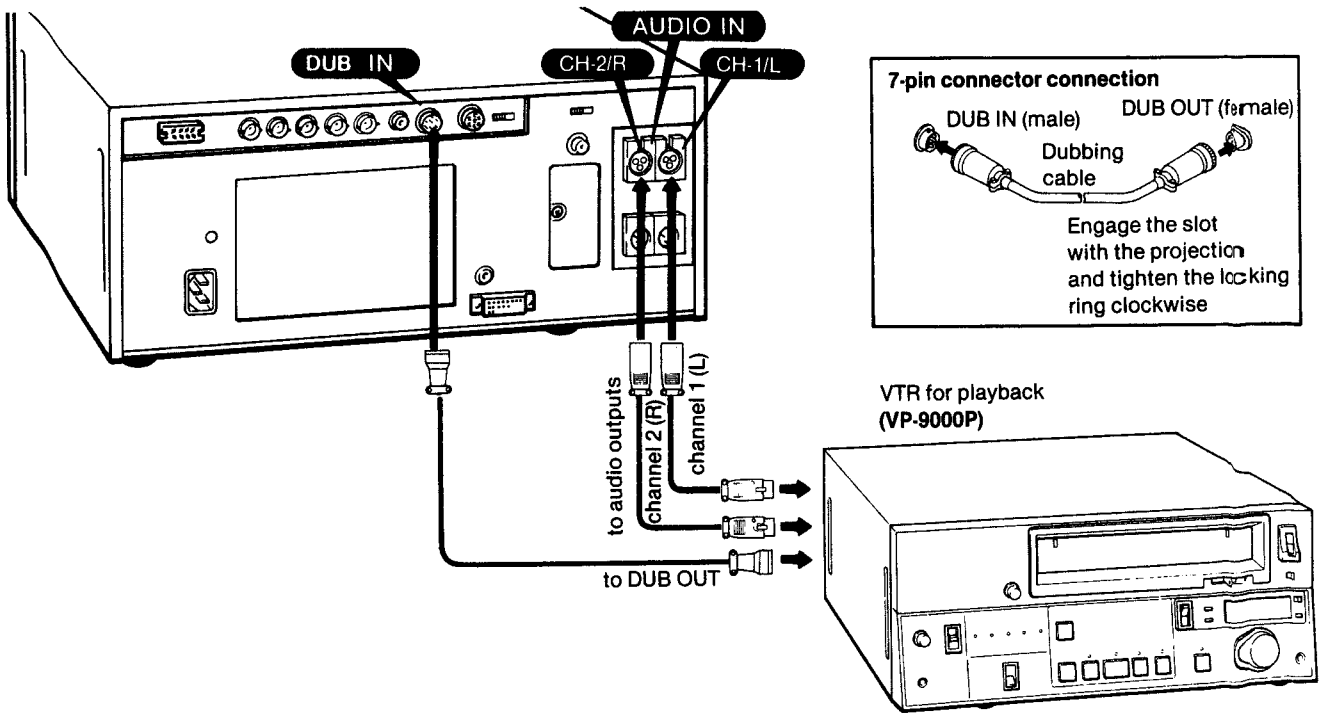


1-3-2. Connection to a VTR

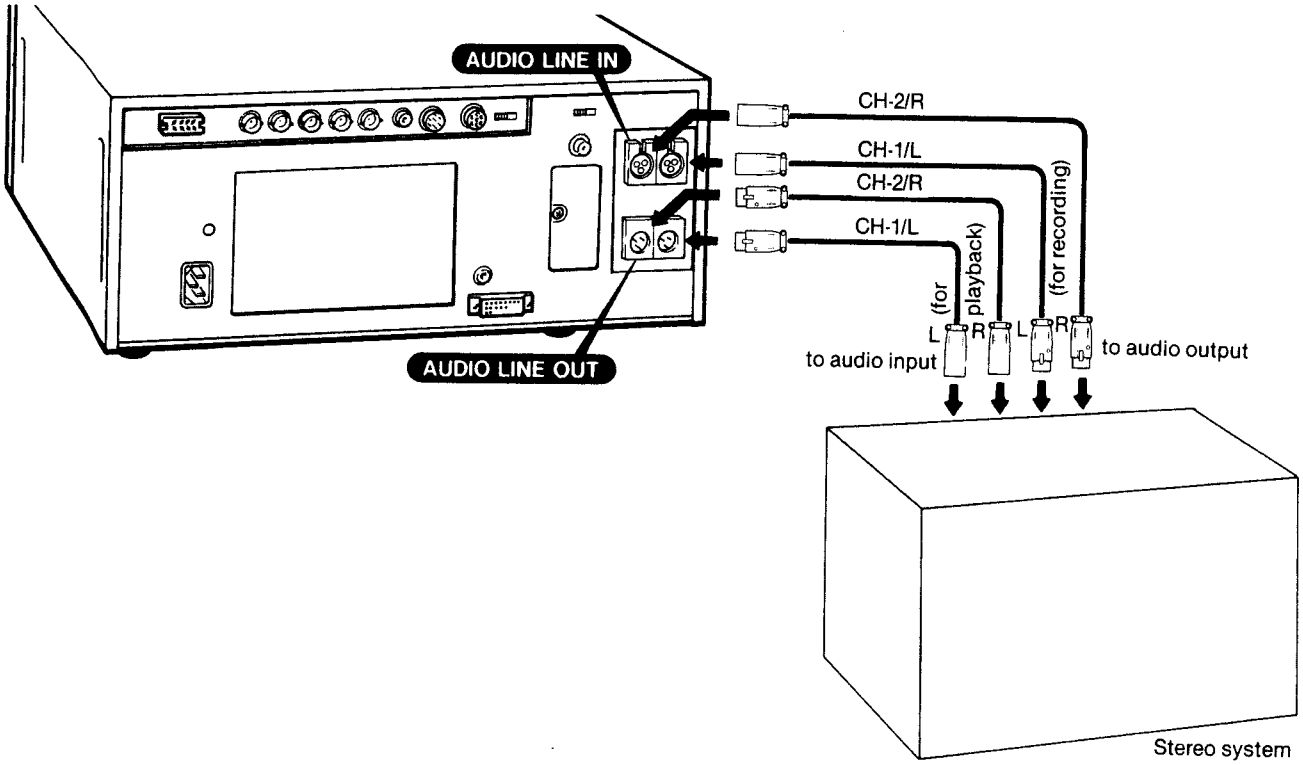
FOR TAPE DUBBING WHEN THE PLAYER HAS NOT THE DUB CONNECTOR



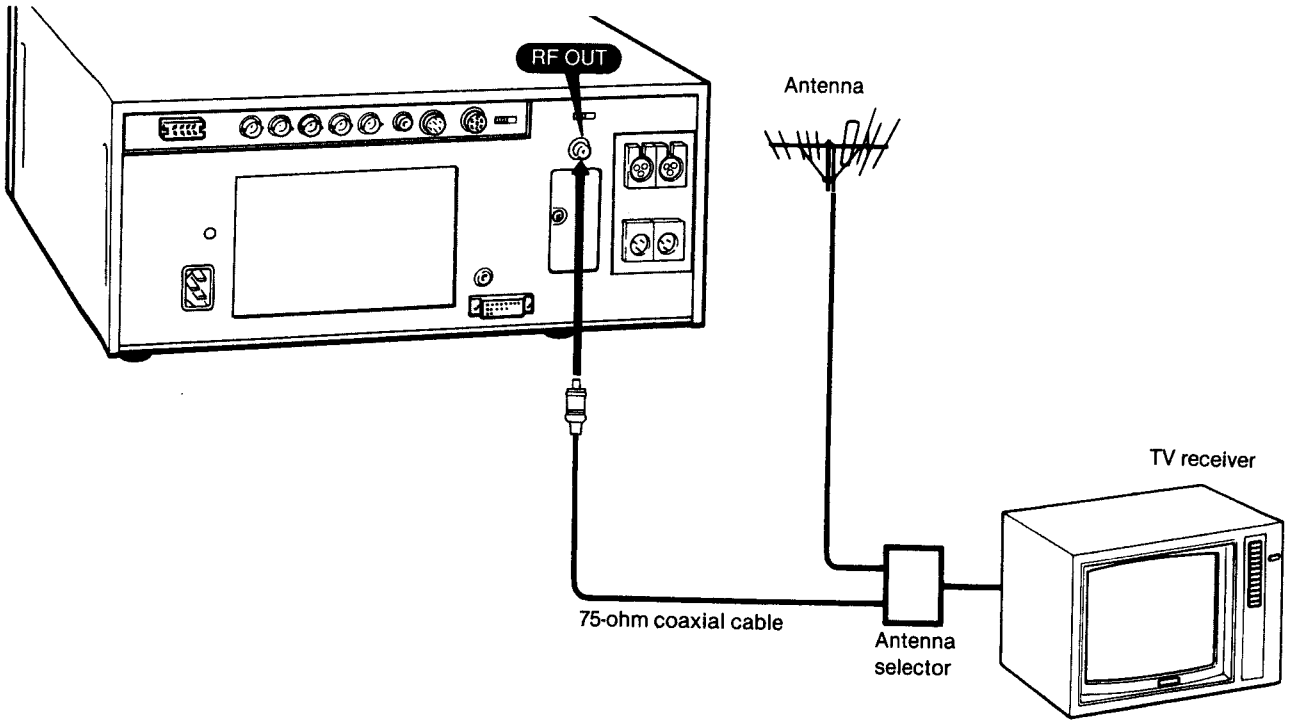
FOR TAPE DUBBING WHEN THE PLAYER HAS THE DUB CONNECTOR



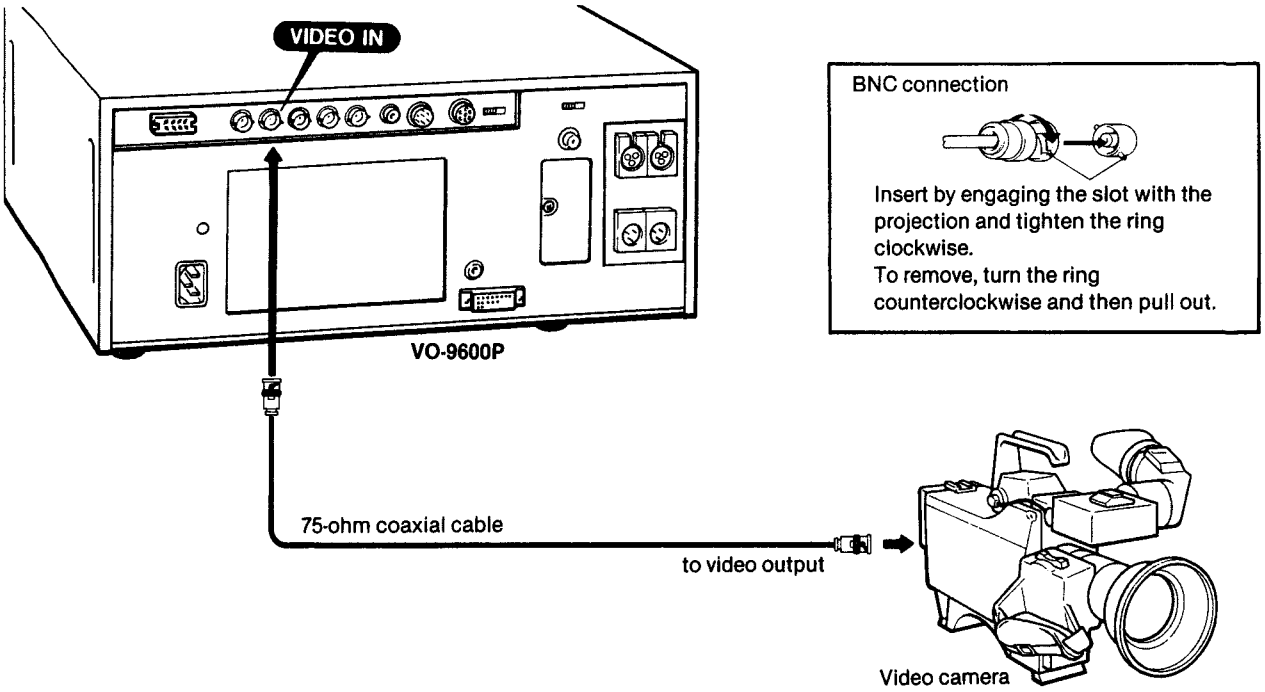
1-3-3. Connection to a Stereo System



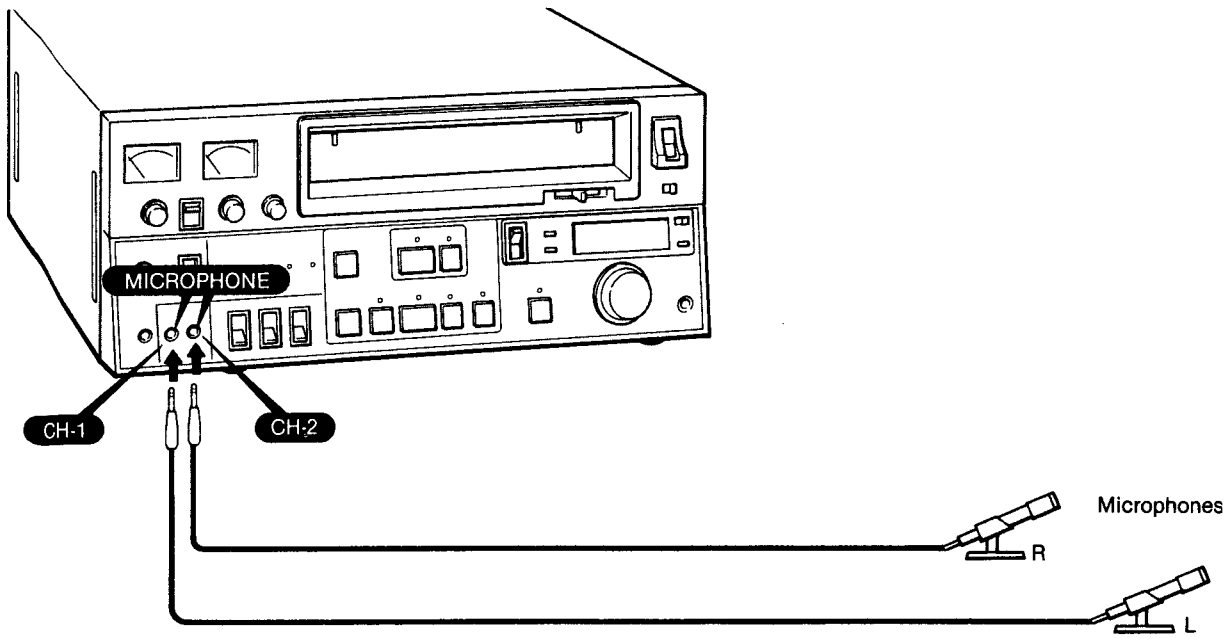
1-3-4. Connection to a TV Receiver



1-3-5. Connection to a Video Camera


VIDEO IN
VO-9600P
BNC connection
Insert by engaging the slot with the projection and tighten the ring clockwise.
To remove, turn the ring counterclockwise and then pull out.
75-ohm coaxial cable
to video output
Video camera

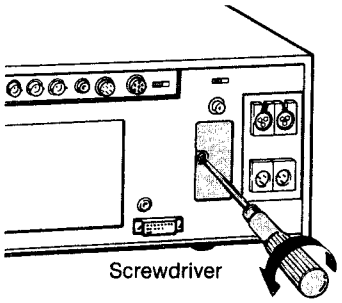
1-3-6. Connection to Microphones



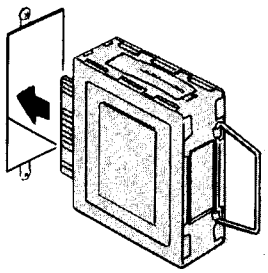
1-4. TO VIEW A PICTURE ON A TV RECEIVER

1-4-1. Installing the RF Modulator

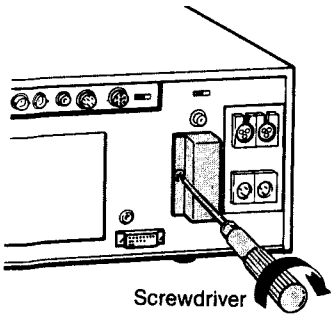
1 Remove the lid of the RF modulator compartment.



2 Install the modulator into the compartment aligning the direction properly.



3 Attach the supplied compartment cover with the original screws.



1-4-2. Connection to a Color TV Receiver

1 Set the ANT/VTR switch on the antenna selector to VTR.

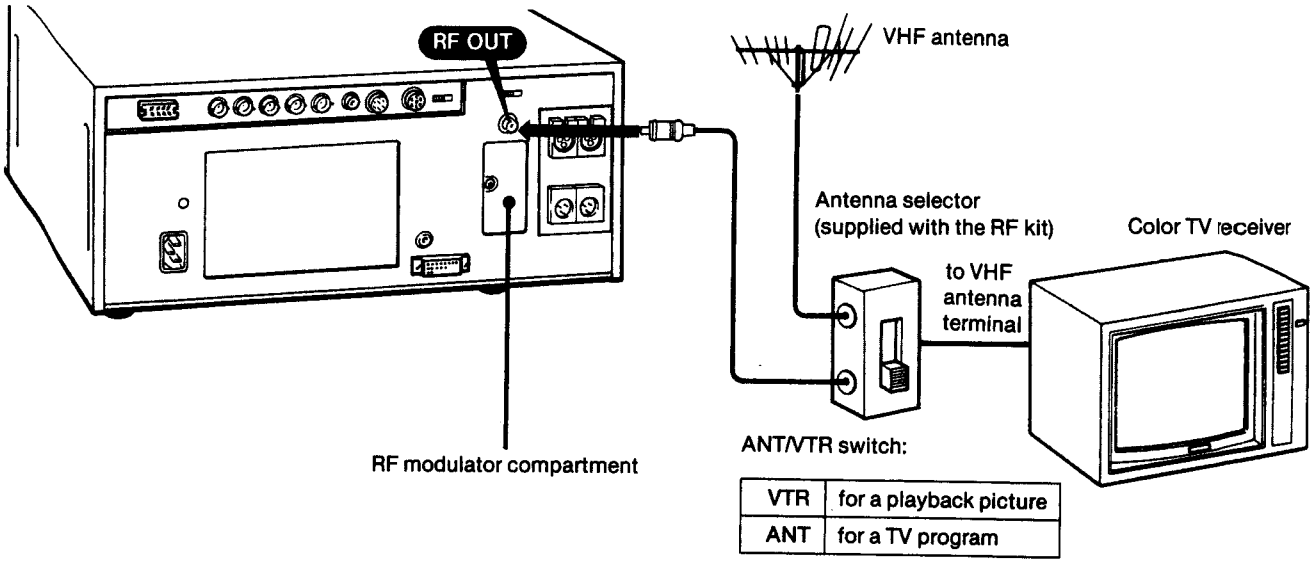
2 Turn on the TV receiver, and select the channel for VTR (the same channel with the output channel of the RF modulator).

3 Turn on the recorder.

4 Insert a recorded cassette.

5 Select the desired audio channel with the AUDIO MONITOR switch.

6 Press the PLAY button. You can see a playback picture on a TV screen.



1-5. OPERATION

To stop the tape momentarily

Press the PAUSE button. To resume recording, press the PAUSE button again.

Long pause mode

If the pause mode continues for more than 8 minutes, the tape around the head drum automatically slackens to protect the video head and the tape. This is called "long pause mode". To release the long pause mode, press the PAUSE button.

When recording is finished

Press the STOP button.

If the recording is done to the end of a tape

The tape automatically rewinds to the beginning and stops.

Note on recording

Do not move the SKEW lever while recording.

If the tape does not run by pressing any of the function buttons

1 Press the EJECT button and take out the cassette.
2 Turn the reel to the direction of the arrow on the bottom of the cassette until the leader tape is completely taken up.
3 Insert the cassette again.

E-to-E (Electronics-to-Electronics) mode

An input video signal which has passed the amplifier in the recorder, is displayed on the monitor screen. This is the E-to-E mode picture, permitting the input signal to be checked on the monitor screen.

If a hooking distortion appears in the upper part of the picture

Move the SKEW lever slowly to the right or left until a normal picture is obtained.

- When the playback of this particular tape is finished, be sure to return the SKEW lever to the center position.
- The SKEW lever automatically returns to the center position when the recorder enters the recording mode.

In snow or streaks may appear on the picture

Slowly turn the TRACKING control clockwise or counterclockwise until the best possible picture is obtained.

- When the playback of this particular tape is finished, be sure to return the TRACKING control to the center FIXED position.

Search operation

A desired portion can be quickly located with the search dial.

1 Press the SEARCH button.
2 Turn the search dial towards;
FORWARD (right): to play in the normal direction
REVERSE (left): to play in the reversed direction
The playback speed varies from 1/30, 1/10, 1/5, 1/2, 1, 2 to 5 times normal speeds according to the dial rotation angle.
3 Set the dial to the center "0" position at the desired point.

NOTE:

- Guardband noise may flow on the playback picture with a speed other than the normal speed as the servo system is not locked during search operation.
- If the TBC switch is set to ON with no time base corrector connected, the picture does not lock in the search mode and it may roll vertically.

To release the search operation

Press either of the PLAY, REW, F FWD or STOP button.

To stop the repeat playback

Press the STOP button.

Note on repeat playback

When the repeat playback continues for a long period of time using the CTL signal, the playing portion may be shifted a little. Precise repeat playback can be obtained when a tape on which frame codes have been recorded is used and the BKU-701 is installed.

When the programmed operation is finished,

Be sure to return the PROGRAMMED OPERATION switch to OFF.

To check the memorized points

1 Press the STOP button to stop the tape.

2 Set the PROGRAMMED OPERATION switch to .

3 Press either the MARK IN A or B button.
The memory on that button will be displayed on the time counter.

To display the time between two particular points designated for a repeat playback

1 Stop the tape with the STOP button.

2 Set the PROGRAMMED OPERATION switch to .

3 Press the MARK IN A and B buttons simultaneously.
While the buttons are pressed, the time between the designated points will be displayed on the time counter.

Memory back up function

The last memories on the MARK IN A and B buttons and the last time counter display will be maintained due to the built-in Lithium battery even if the power is turned off. the battery provides approx. 3-year backup after the shipment. Should the memories be lost, the battery may have been exhausted.

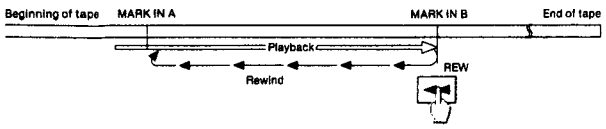
To erase the memory

You can memorize only one point on each MARK IN A or B button. If the button is pressed several times, only the last point will be memorized.

When the RESET button is pressed with the PROGRAMMED OPERATION switch set at OFF or ⇥|← , the memories are erased and the "00:00" point will be memorized on both buttons.

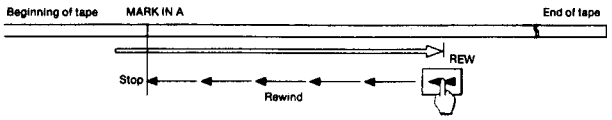
To locate a desired point

1 Set the PROGRAMMED OPERATION switch to OFF.
2 Play the tape and stop it at the desired point momentarily.
3 Press the MARK IN A button.
Resume the playback.
4 Set the PROGRAMMED OPERATION switch to ⇥|← .
5 Press the REW button.
The tape will stop at the memorized point.



To repeat a desired portion

1 Set the PROGRAMMED OPERATION switch to OFF.
2 Play the tape and stop it momentarily at the point from which the playback is to be started.
3 Press the MARK IN A button.
4 Search for a point where the playback is to be stopped and stop the tape momentarily at that point.
5 Press the MARK IN B button.
6 Set the PROGRAMMED OPERATION switch to A/B .
7 Press the REW button.
The portion between the points memorized on the MARK IN A and B button is repeatedly played back.



To repeat between the beginning of a tape and a particular point

1 Set the PROGRAMMED OPERATION switch to OFF.

2 Search for a point where the playback is to be stopped and stop the tape momentarily at that point.

3 Press the MARK IN B button.

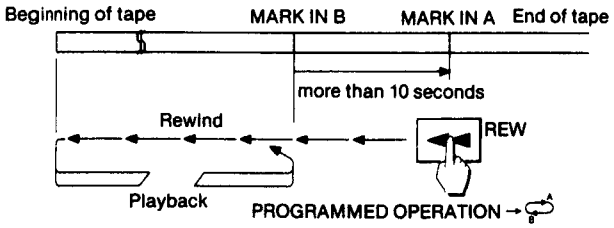
4 Press the PLAY button. After playing the tape for more than 10 seconds, stop the tape momentarily.

5 Press the MARK IN A button.

6 Set the PROGRAMMED OPERATION switch to .

7 Press the REW button.

The tape rewinds to the beginning and the unit enters the playback mode. Then, the designated portion to the point memorized on the MARK IN B button is repeatedly played back.



To repeat between a particular point and the end of the tape

1 Set the PROGRAMMED OPERATION switch to OFF.

2 Search for the point from which the playback is to begin and stop the tape momentarily at that point.

3 Press the MARK IN A button.

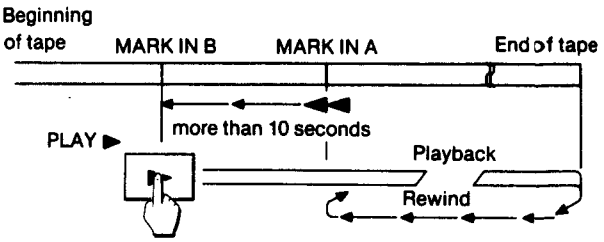
4 Press the REW button to rewind the tape for more than 10 seconds then stop the tape momentarily.

5 Press the MARK IN B button.

6 Set the PROGRAMMED OPERATION switch to .

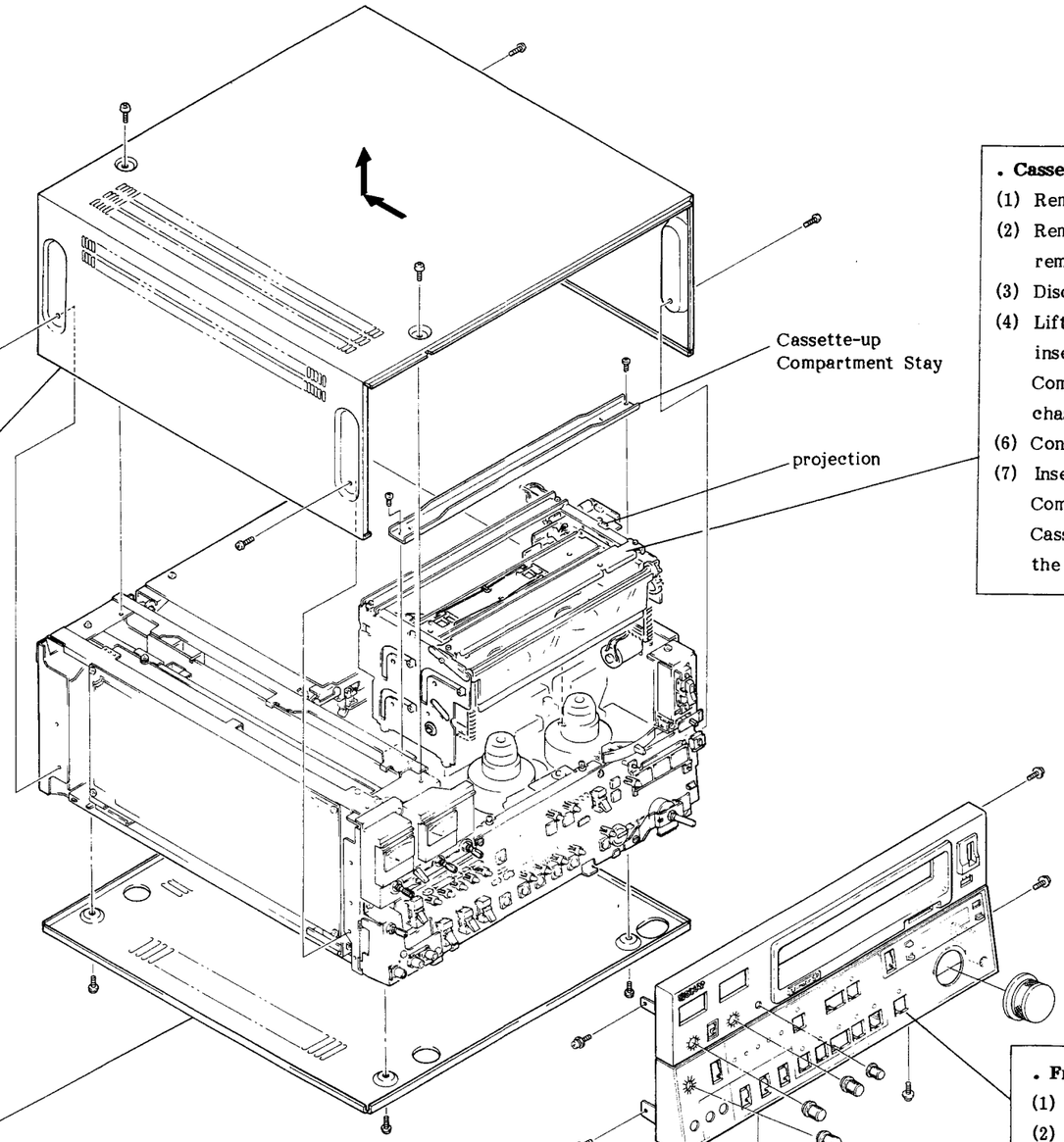
7 Press the PLAY button.

The tape is played back to the end and rewinds to the point memorized on the MARK IN A button, and the playback of the portion from that point to the end of the tape is repeated.



SECTION 2
SERVICE INFORMATION

2-1. REMOVAL OF CABINET



. Upper Case

Remove the six fixing screws shown in the figure. Then remove the Upper Case from the unit in the direction of the arrow.

. Cassette-up Compartment

(1) Remove the Upper Case.
(2) Remove the two fixing screws and then remove the Cassette-up Compartment Stay.
(3) Disconnect CN1 on the CC-31 board.
(4) Lift the Cassette-up Compartment Block, insert the projections of the Cassette-up Compartment Block into the holes of the chassis.
(6) Connect CN1 on the CC-31 board.
(7) Insert the projections of the Cassette-up Compartment Block into the holes of the Cassette-up Compartment Stay (as shown in the figure) and then fix the screws.

. Lower Case

Remove the four fixing screws. Then remove the Lower Case from the unit.

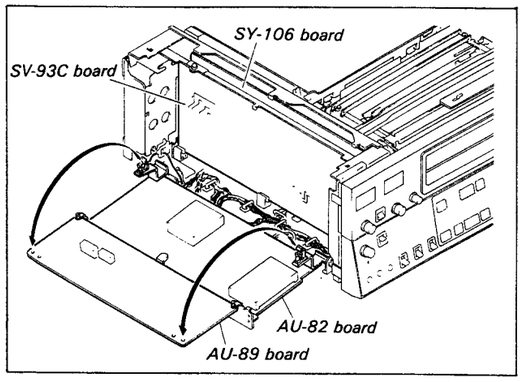
. Front Panel

(1) Remove the Upper Case.
(2) Remove the six fixing screws (two screws each on the left and right sides and the bottom).

2-2. HOW TO SERVICE THE PRINTED CIRCUIT BOARD

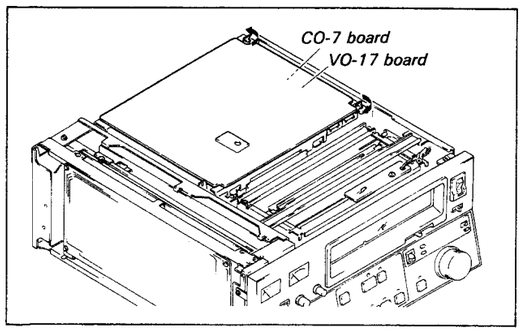
2-2-1. AU-82, AU-89, SV-93C and SY-106 Boards

Open the AU-82 and AU-89 boards to repair as shown in the figure.



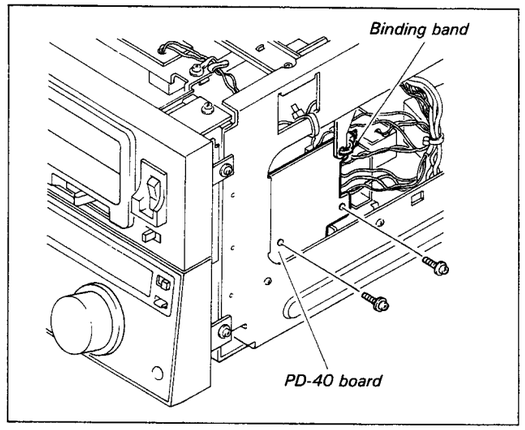
2-2-2. VO-17 Board

Turning the fastener to the direction of the arrow, the VO-17 board can be opened. Then, the component side of the VO-17 board can be repaired.



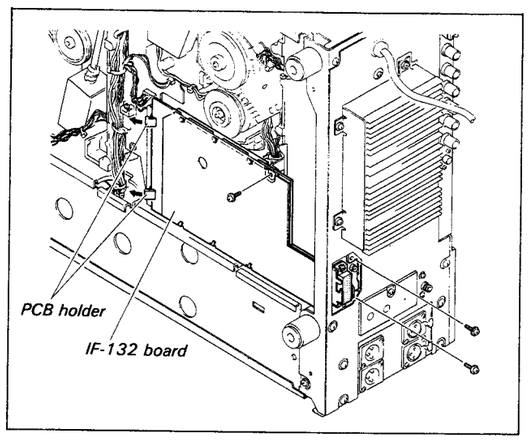
2-2-3. PD-40 Board

Cut a binding band and remove two screws, and then remove the PD-40 board.



2-2-4. IF-132 Board

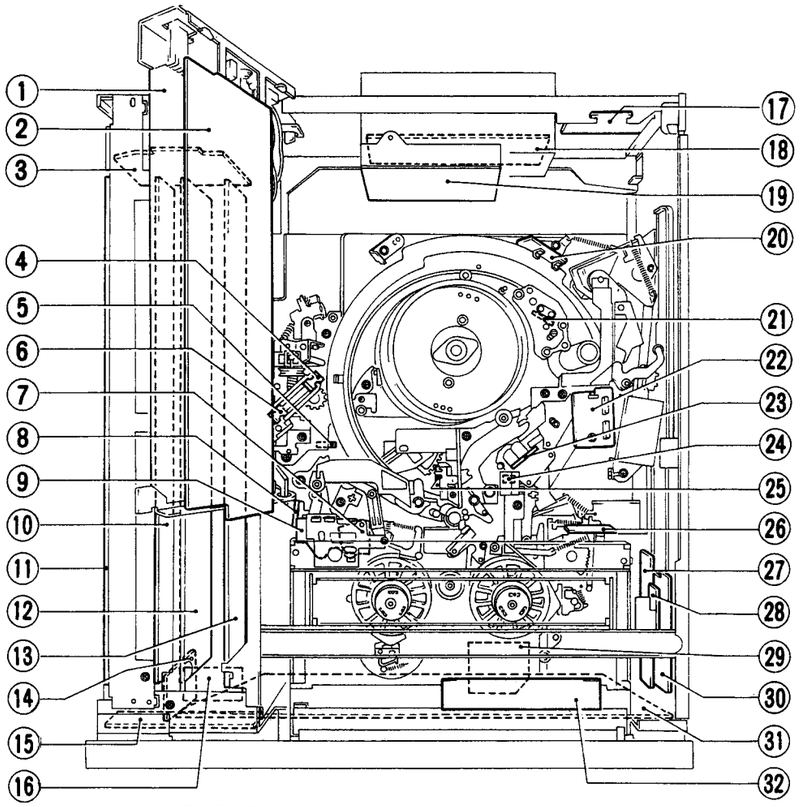
(1) Open the PCB holder in the direction of the arrow, and then open the IF-132 board.
(2) Remove a screw.
(3) Remove the two screws which install RX DATA terminal and REMOTE terminal.



2-3. MAIN PARTS LOCATION

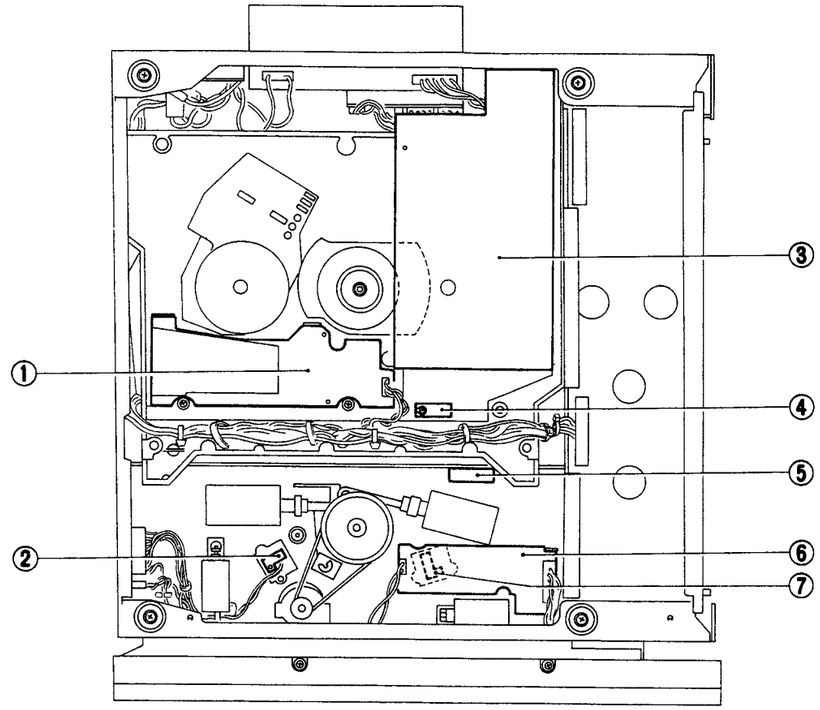
2-3-1. Location of the Printed Circuit Board

[TOP VIEW]



1 VO-17 Board
2 CO-7 Board
3 CP-112 Board
4 PH-5 Board
5 LM-13 Board
6 PH-5 Board
7 SE-46 Board
8 PTC-34 Board
9 PTC-30 Board
10 AU-89 Board
11 AU-82 Board
12 SV-93C Board
13 SY-106 Board
14 HP-30 Board
15 MT-29 Board
16 MC-28 Board
17 AC-89 Board
18 UR-14E Board
19 DC-31A Board
20 PTC-33 Board
21 DUS-92 Board
22 DUS-147 Board
23 EC-28 Board
24 PH-5 Board
25 PH-5 Board
26 CC-33 Board
27 CC-32 Board
28 CC-31 Board
29 RM-39 Board
30 PD-40 Board
31 KY-105C Board
32 LP-41 Board

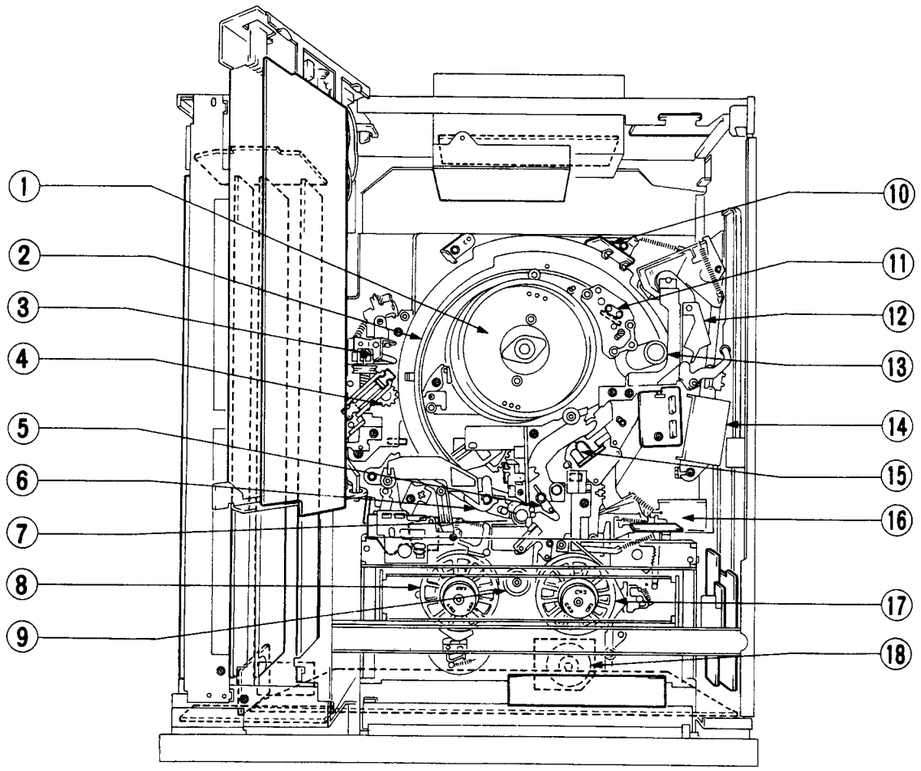
[BOTTOM VIEW]



1 RP-35 Board
2 PTC-35 Board
3 IF-132 Board
4 PT-9 Board
5 TG-22 Board
6 PD-41 Board
7 PTC-35 Board

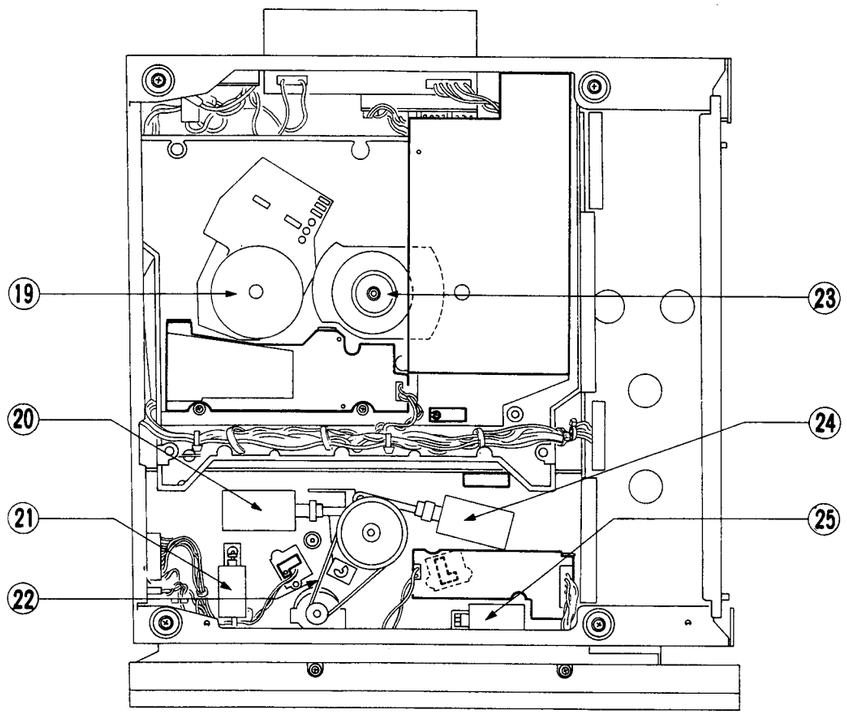
2-3-2. Location of the Mechanical Main Parts/ Components

[TOP VIEW]



1 Head Drum
2 Threading Ring
3 T Correction Guide
4 Gear Box
5 S Drawer Arm
6 T Drawer Arm
7 Pinch Roller
8 Take-up Reel Table
9 FF/REW Idler
10 FR Detector
11 Audio/CTL Head
12 Pinch Lever
13 Capstan Shaft
14 Pinch Solenoid
15 CTL PB Head
16 Search Solenoid
17 Supply Reel Table
18 Reel Motor

[BOTTOM VIEW]



19 Capstan Motor
20 Supply Idler Solenoid
21 Supply Brake Solenoid
22 Belt for FF/REW Idler
23 Drum Motor
24 Take-up Idler Solenoid
25 Take-up Brake Solenoid

2-4. PRINTED CIRCUIT BOARD

Circuit information is provided below.

SYSTEM	BOARD	CIRCUIT FUNCTION
VIDEO	RP-35	PB Amplifier
	VO-17	Y REC/PB (Y/C Separator)
	CO-7	Color REC/PB
AUDIO	AU-82	PB Amplifier
	AU-89	Dolby
	CP-112	Output Amplifier
	DUS-92	Audio CTL Head
	DUS-147	Audio CTL Head
	HP-30	Headphones
	MC-28	MIC In
	MT-29	Audio Level Meter
SERVO	EC-28	CTL Head
	DUS-92	Audio CTL Head
	DUS-147	Audio CTL Head
	PT-9	Reel Motor Driver
	SV-93C	Servo System
POWER	AC-89	AC Input
	DC-31A	DC Supply
	UR-14E	Switching Regulator
KEY	KY-105C	Function Key/Display
SYSTEM CONTROL	IF-132	33P Interface
	PD-40	Plunger Solenoids
	PD-41	Plunger Solenoids
	PH-5	Tape Beginning/End Sensor
	SY-106	System Control
OTHERS	CC-31	Cassette Compartment Driver
	CC-32	Cassette In Detector
	CC-33	Cassette Down Detector
	LM-13	Threading Motor
	LP-41	Cassette Compartment Light
	PTC-30	SP, Miss REC. KCA Detector
	PTC-33	FR Stop Detector
	PTC-34	Unthreadend Detector
	PTC-35	S/T Reel Rotation Detector
	RM-39	Reel Motor
	SE-46	Tension Regulator Detector
	TG-22	Tension Regulator LED

2-5. CONNECTORS

When external cables are connected to the various connectors on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

Panel Indication	Connector
TV	1-506-161-00 CONNECTOR, 8P, MALE
SYNC IN RF VIDEO IN VIDEO OUT 1,2	1-560-069-11 PLUG, BNC, MALE
AUDIO MONITOR	1-506-311-00 PLUG, PIN
RF OUT	1-508-459-00 CONNECTOR, AERIAL
AUDIO LINE IN CH-1, CH-2	1-508-084-00 CONNECTOR, XLR, 3P, FEMALE
AUDIO LINE OUT CH-1, CH-2	1-508-083-00 CONNECTOR, XLR, 3P, MALE
DUB IN	1-561-055-00 PLUG, 7P, FEMALE
DUB OUT	1-508-948-00 PLUG, 7P, MALE

2-6. OUTPUT SIGNAL OF THE CONNECTOR

VIDEO OUT 1, 2 : 1.0 ± 0.2 Vp-p,
75 ohms, unbalanced,
sync negative

AUDIO LINE OUT CH-1/L, CH-2/R
: +4 dB (600-ohm load),
balanced

AUDIO MONITOR : -5 dB (47-kohm load)

2-7. SPARE PARTS

(1)

> The shaded and ⚠ -marked components are critical to safety.
> Replace only with the same components as specified.

(2) Replacement parts supplied from the Sony Parts Center will sometimes have a different shape and outside view from the parts which are used in the unit. This is due to "accommodating improved parts and/or engineering changes" or "standardization of genuine parts".

. This manual's exploded views and electrical spare parts lists indicate the part numbers of "the present standardized genuine parts".

. Regarding engineering part changes by our engineering department, refer to Sony service bulletins and service manual supplements.

(3) The parts marked with "s" in the SP column of the exploded views and electrical spare parts lists are normally stocked for replacement purposes. The parts marked with "o" in the SP column are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

2-8. SELECT SWITCH SETTING

Along with the select switches on the control panel and the connector panel, the switch listed below is on the SY-106 board. This switch must be set according to operating conditions.

. SY-106 Board

SW1: SELF DIAGNOSTIC Switch

ON: SELF DIAGNOSTIC mode

OFF: NORMAL mode

When the unit is shipped, this switch is set to the OFF position.

2-9. HOW TO OPERATE THE MACHINE WITHOUT INSTALLING A CASSETTE TAPE

(1) Remove the Cassette-up Compartment. (Refer to Section 2-1.)
(The Tape Beginning Sensor and Tape End Sensor are disabled according to disconnect the connector of Cassette-up Compartment.)

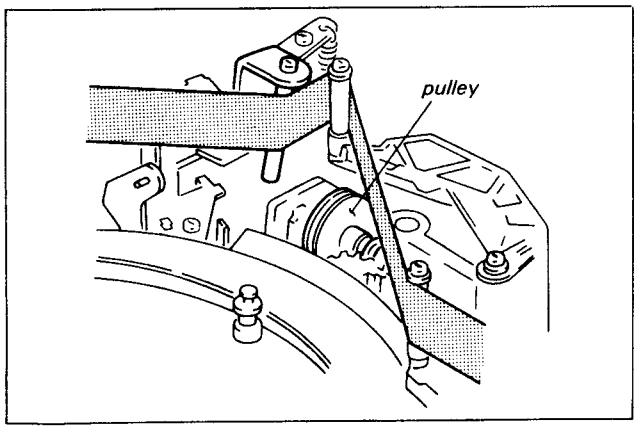
(2) Turn the power ON. (The machine enters the FR-STOP mode automatically.)

(3) The machine can be placed into the desired mode by pressing the function button corresponding to the mode.

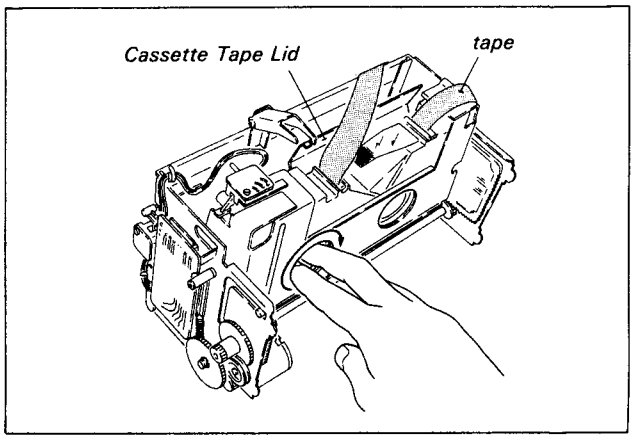
2-10. CASSETTE REMOVAL PROCEDURE WHEN NORMAL EJECTION IS NOT POSSIBLE

If the EJECT operation becomes impossible due to trouble or the Cassette-up Compartment does not rise when the EJECT operation takes place, the cassette tape can be removed from the set by following the procedures described below.

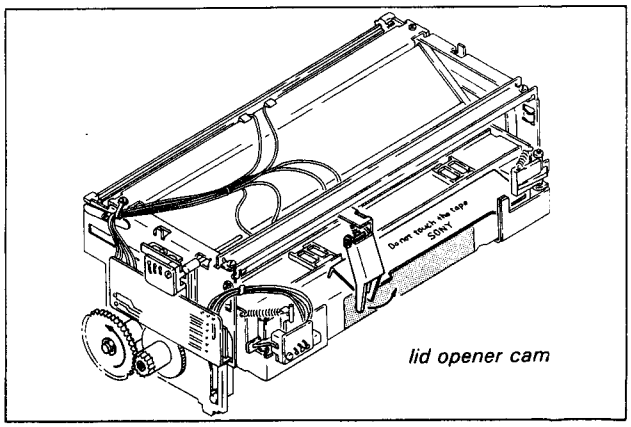
(1) Turn the power OFF.
(2) Remove the Upper Case. (Refer to Section 2-1.)
(3) Turn the white pulley of the Gear Box by hand in a clockwise direction looking from the front panel side until the Threading Ring is in the FR-STOP position (until the S Drawer Arm is located at the front of CTL head). (At this time, the Threading Ring moves in the unthreading direction. But the tape remains at the position of threading completion.)



(4) Disconnect the connector CN1 on the CC-31 board of the Cassette-up Compartment.
(5) Remove the Cassette-up Compartment Stay. (Refer to Section 2-1.)
(6) Slowly lift the Cassette-up Compartment with the cassette tape in it. Remove the tape remaining in the set carefully so that it is not damaged.
(7) Hold the Cassette Tape Lid so that it does not close. Wind the tape into the cassette by turning the reel hub on the back of the cassette by hand.



(8) Raise the cam for opening the lid and close the cassette lid.



(9) Remove the tape from the Cassette-up Compartment.
(10) Turn the gear on the right side of the Cassette-up Compartment by hand in a counterclockwise direction in order to place the Cassette-up Compartment into the up state.
(11) Locate the cause of the trouble and remedy the problem.

2-11. DIAGNOSTIC FUNCTION IN SYSTEM CONTROLLER

2-11-1. Outline of Self Diagnosis

The VO-9600P has a self diagnostic function for the system control circuit which determines if the source of the problem is in the microcomputer itself or not.
The system control function is classified into mechanical and electrical operation controls. Mechanical operation control defects are efficiently analyzed using the self diagnostic function.
The VO-9600P employs six one-chip microcomputers. M1 and M2 which include the respective memories and I/O ports, are used for the master controls. M3 is for controlling the capstan motor, M4 is for controlling the display, M5 is for decoding the remote control signal and M6 is used for 33-pin interface.

2-11-2. Diagnosis Method

When SW1 on the SY-106 board is set to the ON position, the self diagnostic function is activated. For the diagnostic result display, the input and output data of the microcomputer's I/O port is displayed four bits at a time for each test address, as shown on pages 2-14 through 2-17.
When the RESET button is pressed, the test address is displayed. When the MARK IN A button is pressed while the RESET button is pressed, the LSB of the test address is changed as shown below.

→ 0 → 1 → 2 → ··· → 9 → L → H → P → R → -(minus) → (blank) →

When the MARK IN B button is pressed while the RESET button is pressed, the MSB of the test address is changed as shown below.

→ 0 → 1 → 2 →

Twenty-six test addresses are available in hexadecimal notation. Therefore, when the RESET, MARK IN A and MARK IN B buttons are pressed, any test address data (digits 1 through 4) shown in the table on pages 2-14 through 2-17 can be displayed on the front panel LEDs. On the LED display, the logic "H" is displayed "1", and the logic "L" is "0". This logic value is changed depending on the VTR operating condition.
Therefore, the H:DRUM STOP signal at test address "01" can be observed by the following procedure.

(Operation)	(LED display) CTL display	(Remarks)
	↓	
SW1/SY-106 board — ON	1100	DIAGNOSTICS MODE
	↓	
Press the RESET button	00	TEST ADDRESS = 00
	↓	
Press the MARK IN A button once while pressing the RESET button	01	TEST ADDRESS = 01
	↓	
Release the RESET button	1111	Data for 01
	↑	
	H:DRUM STOP signal	

If the drum is stopped at this time, the MSB displays "1" ("H"). When the cassette tape is inserted into the VTR and the VTR is put into the PLAY mode, the display "1" is changed to "0" (which indicates the rotation command).
The input and output signals of the microcomputer in each mode are shown in the timing chart on pages 2-19 through 2-36. If an input signal is properly sent to the microcomputer in each mode, the microcomputer sends an output signal shown in the timing chart.

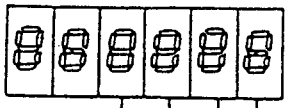
2-11-3. Troubleshooting

The troubleshooting with the self diagnostic function is described below.

The mode conversion diagram of the mechanical operation is shown on page 2-18. Referring to this diagram, check where the present trouble occurs during mode conversion, or where malfunctions are found during mechanism (e.g., motor or solenoid) operation. When the mode in which the trouble occurs is detected, refer to the timing chart described in the mode conversion diagram. The timing chart shows the input and output signals of the microcomputer in each mode. Therefore, when the motor or solenoid is abnormal, observe the output signal line using an LED to check whether it is changed as shown in the timing chart. When the output signal from the microcomputer is normal, check the output signal of the next microcomputer. This process is continued. If the signal line is not changed as shown in the timing chart, refer to the schematic diagram for the trouble location. The timing chart lists an input/output signal name, signal display test address and digit, and the microcomputer pin name through which a signal is input and output.

For example, the H:DRUM STOP signal is "01-DIGIT 1" and is displayed in the MSB (digit 1) when the test address is "01". Whether the input and output signals are changed as shown in the timing chart is checked with the actual VTR operation.

2-11-4. Diagnosis List



TEST ADDRESS	DISPLAYED DATA				INPUT/OUTPUT PORT NAME ON THE MICRO PROCESSOR	
	DIGIT 1	DIGIT 2	DIGIT 3	DIGIT 4		
00	CAPSTAN CMD FWD/REW (1=FWD CMD 0=REV CMD	DRUM NORMAL/SEARCH (1=NORMAL 0=SEARCH MODE	AUTO CH-2 PB/EE (1=EE 0=PB	AUTO CH-1 PB/EE (1=EE 0=PB	E1	OUT/IC7 on SY
01	H:DRUM STOP CMD (1=DRUM STOP 0=DRUM ROTATE	VIDEO PB/EE (1=PB 0=EE	L:AUDIO CH-2 REC 0=CH-2 REC	L:AUDIO CH-1 REC 0=CH-1 REC	E2	OUT/IC7 on SY
02	CTL COUNT UP/DOWN (1=COUNT UP 0=COUNT DOWN	L:SKEW SOL.ON (1=OFF 0=ON	L:VIDEO CH-B REC 0=CH-B REC	L:VIDEO CH-A REC 0=CH-A REC	E3	OUT/IC7 on SY
03	H:REEL REV 1=SEARCH REV MODE	H:REEL FWD 1=PLAY.REC.orSEARCH FWD MODE	H:REEL STILL 1=PLAY(REC)PAUSE or SEARCH PAUSE	H:REEL STOP 1=STOP MODE	P	OUT/IC7 on SY
04	H:REEL FF/REW (1=FF or REW MODE 0=other mode	L:SEARCH SOL.ON (1=OFF 0=ON	L:PINCH SOL.ON (1=OFF 0=ON	1	0	OUT/IC7 on SY
05	L:T-BRAKE SOL.ON (1=OFF 0=ON	L:S-BRAKE SOL.ON (1=OFF 0=ON	L:T-IDLER SOL.ON (1=OFF 0=ON	L:S-IDLER SOL.ON (1=OFF 0=ON	E0	OUT/IC7 on SY
06	SEARCH SPEED DATA (NOTE 1)				R2	OUT/IC7 on SY
07	L:CASSETTE COMPARTMENT UP CMD 0=UP	L:CASSETTE COMPARTMENT DOWN CMD 0=UP DOWN	L:THREAD MOTOR ON 0=THREAD	L:UNTHREAD MOTOR ON 0=UNTHREAD	R3	OUT/IC7 on SY
08	L:SERVO LOCK (1=UNLOCK 0=LOCK	L : FR-UNTHREAD POSITION	H:CASSETTE DOWN 1=DOWN (NOTE 2)	H:CASSETTE IN 1=INSERTED	K	IN/IC7 on SY
09	H:DRUM STOP (1=STOP 0=ROTATE	L : REEL STOP (1=STOP 0=ROTATE	H:T-IDLER ON (1=ON 0=OFF	H:T-REEL STOP (1=STOP 0=ROTATE		
0L	L:CAPSTAN STOP (1=ROTATE 0=STOP	CAPSTAN FWD/REV (1=FWD 0=REV	UNTHREAD END (NOTE 3)	THREAD END	R1	IN/IC7 on SY
0H	0	0	PAUSE SELECT-1 (NOTE 4)	PAUSE SELECT-0	E4	IN/IC7 on SY
0P	L:DRUM ROTATE (1=STOP 0=ROTATE	L:CASSETTE CONNECT 0=COMPARTMENT IS CONNECTED	L:SLACK DET:OFF (NOTE 5)	0	E5	IN/IC7 on SY
0R	RING SLACK ERROR MESSAGE (NOTE 6) The condition of VTR is detected by IC7/SY board when the ring slack occurs. The RING SLACK means that the threading ring isn't rotating.					
0-	0	0	0	0		
0(Blank)	0	0	0	0		

10	H:FF KEY ON (1=ON 0=OFF	H:PLAY KEY ON (1=ON 0=OFF	H:REW KEY ON (1=ON 0=OFF	H:STOP KEY ON (1=ON 0=OFF
11	H:DUB KEY ON (1=ON 0=OFF	H:REC KEY ON (1=ON 0=OFF	0	H:PAUSE KEY ON (1=ON 0=OFF
12	0	0	0	H:EJECT KEY ON (1=ON 0=OFF
13	H:SERCH CMD (1=SERCH 0=NORMAL	FWD/REV CMD (1=FWD 0=REV	0	0
14	H:TIMER PLAY SW ON (1=ON 0=OFF	H:TIMER REC SW ON (1=ON 0=OFF	H:TIMER PLAY STATUS (1=TIMER PLAY 0=OTHER MODE	H:TIMER REC STATUS (1=TIMER REC 0=OTHER MODE
15	CTL/FC SW (1=CTL 0=FC	0	0	0
16	L:MISS-REC SW (1=REC EN 0=REC DIS	EIA/CCIR (1=EIA 0=CCIR	L:DEW DET (1=NOT DETECTED 0=DETECTED	H:PROGRAM REW SW (1=ON 0=OFF
17	H:KEY REQUEST 1=ANY KEY IS TURNED ON	H:REQUEST CMD 1=GOES INTO ANY MODE DURING PROGRAM OPERATION	RECORDER/PLAYER (1=RECORDER 0=PLAYER	H:PROGRAM REPEAT SW (1=ON 0=OFF
18	← SEARCH SPEED DATA (NOTE 1) →			
19	1	1	1	1
1L	1	1	1	1
1H	1	L:RM-690 INHIBIT (1=ENABLED 0=INHIBITED	L:NO CTL (1=NORMAL 0=NO CTL IN PLAY MODE	0
1P	H:REW LED (1=ON 0=OFF	0	0	0
1R	H:REC LED (1=ON 0=OFF	H:PAUSE LED (1=ON 0=OFF	H:PLAY LED (1=ON 0=OFF	H:FF LED (1=ON 0=OFF
1-	H:STD-BY LED (1=ON 0=OFF	H:REV SEARCH LED (1=ON 0=OFF	H:FWD SEARCH LED (1=ON 0=OFF	H:DUB LED (1=ON 0=OFF
1(Blank)	H:FC LED (1=ON 0=OFF	H:KEY INHIBIT 1=SW ON BKU-701 INHIBITS FRONT KEYS	H:HOURS METER ON (1=METER ON 0=METER OFF	H:BKU CONNECTED (1=CONNECTED 0=NOT CONNECTED

20	REEL SLACK ERROR MESSAGE (NOTE 7) The condition of VTR is detected by IC12/SY board when the reel slack occurs. The REEL SLACK means that the reel motor is not rotating.			
21	0	0	0	0
22	0	0	0	0
23	L:UNTHREAD (1=OTHER MODE 0=UNTHREAD MODE	L:RX-DATA REC (1=OTHER MODE 0=RX-DATA REC MODE	L:VIDEO MUTE (1=VIDEO is OUTPUT 0=VIDEO is MUTED	H:AUDIO MUTE (1=AUDIO is MUTE 0=AUDIO is OUTPUT
24	1	0	1	0
25	0	0	0	0
26	0	0	0	0

NOTE 1 SEARCH SPEED DATA

DATA DISPLAYED	TAPE SPEED
0 0 0 0	NOISELESS STILL
0 0 0 1	×1/30
0 0 1 0	×1/10
0 0 1 1	×1/5
0 1 0 0	×1/2
0 1 0 1	×1
0 1 1 0	×2
0 1 1 1	×5
1 0 0 0	×8
1 0 0 1	STILL

NOTE 2 CASSETTE POSITION

CASSETTE DOWN	CASSETTE IN	CASSETTE POSITION
0	0	DURING CASSETTE-IN
0	1	DURING CASSETTE-DOWN
1	0	CASSETTE-UP COMPLETION
1	1	CASSETTE-DOWN COMPLETION

NOTE 3 THREAD END/UNTHREAD END

UNTHREAD END	THREAD END	THREADING RING POSITION
1	1	Between CASSETTE-IN and FR-STOP
0	1	THREAD END position
0	0	Between FR-STOP and THREAD END
1	0	FR-STOP position

NOTE 4 PAUSE SELECT-1/PAUSE SELECT-0

PAUSE SELECT-1	PAUSE SELECT-0	PAUSE TIMER
0	1	8 min
1	1	1 min
1	0	10 sec
0	0	2 sec

NOTE 5 SLACK DETECT
When shorting between TP 3 and GND(E1) on The SY board, SLACK Detector does not operate.
Normal state is "H".

NOTE 6 RING SLACK ERROR MESSAGE(This item shows that the mode when the RING SLACK occurs.)

DATA DISPLAYED				CONDITION
0	0	0	0	RING SLACK is not occurring.
0	0	0	1	CASSETTE DOWN →FR-STOP
0	0	1	0	FR-STOP →THREAD END
0	1	0	0	FR-STOP →CASSETTE DOWN
0	1	0	1	DURING CASSETTE IN

NOTE 7 REEL SLACK ERROR MESSAGE(This item shows that the mode when the RING SLACK occurs.)

DATA DISPLAY				CONDITION
0	0	0	0	REEL SLACK DOES NOT OCCUR
0	1	1	0	FF or REW MODE
0	1	1	1	FR-STOP →FR UNTHREAD
1	0	0	0	THEND → FR-STOP
1	0	0	1	×5 or ×8 SPEED MODE
1	0	1	0	×1 or ×2 SPEED MODE
1	0	1	1	×1/2 SPEED MODE
1	1	0	0	×1/5 SPEED MODE
1	1	0	1	×1/10 SPEED MODE
1	1	1	0	×1/30 SPEED MODE

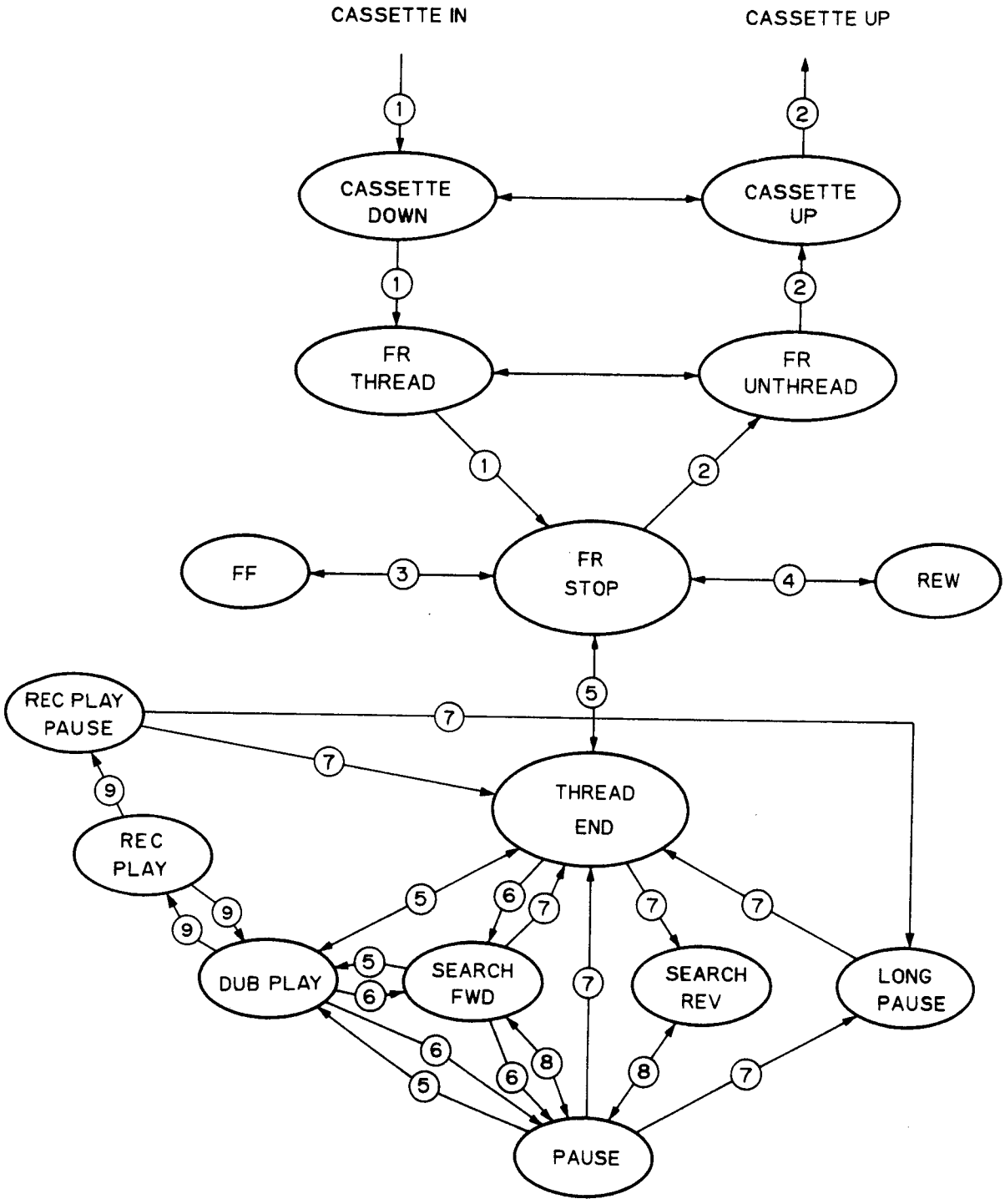
Selecting the Long Pause Timer

TYPE 7 and 9 Series can be select four pattern as the following setting. (The former models can be only one select, 8 min.)

It is can be controlled by TP5 (Address E-6) and JW144 (Address G-2).

JW144	TP5	PAUSE TIMER
SHORT	OPEN	8 min.
SHORT	GND SHORT	2 sec.
OPEN	OPEN	1 min.
OPEN	GND SHORT	10 sec.

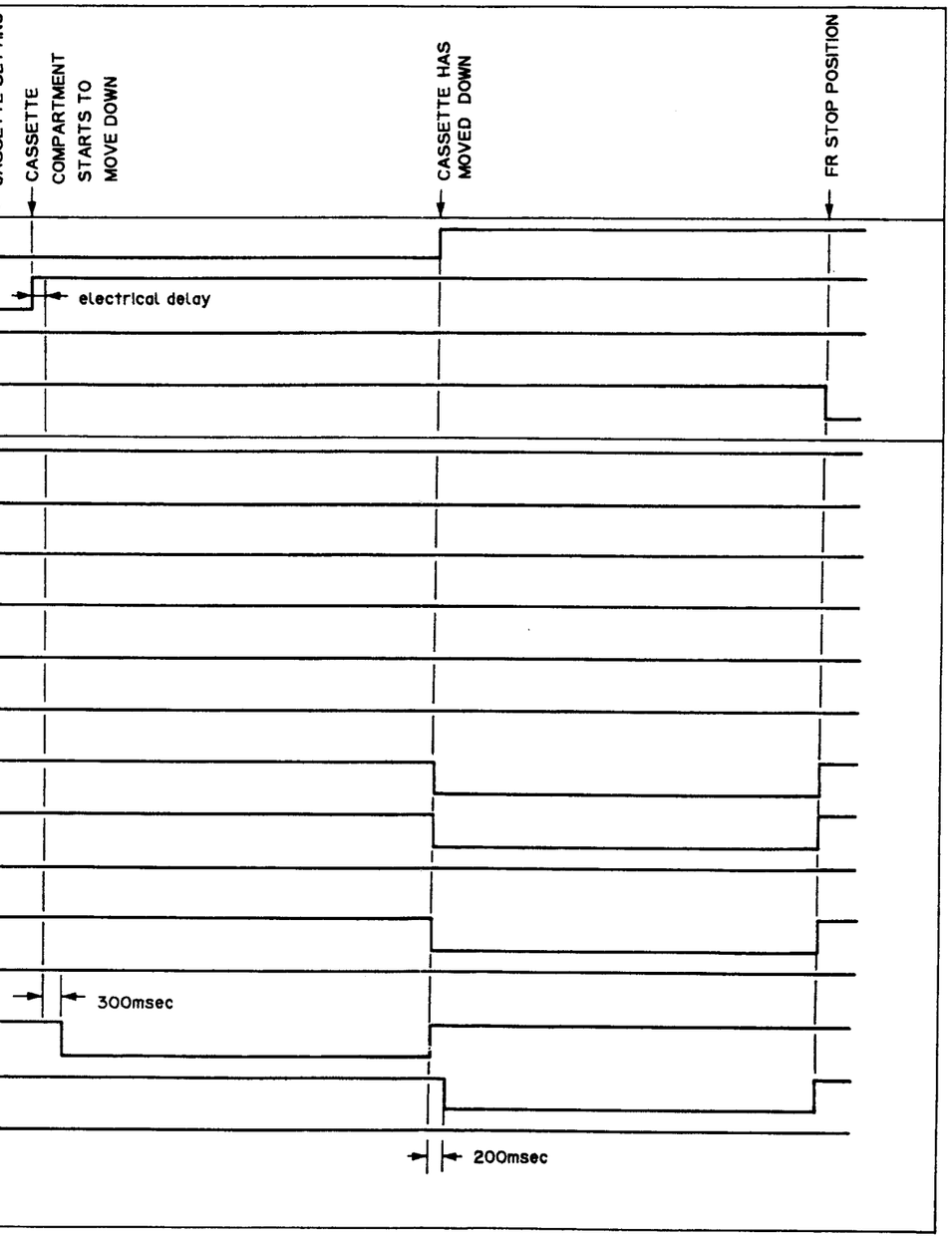
2-11-5. Mode Conversion Diagram and Timing Chart



NOTE: Number in the Figure means title number of Timing chart (page 2-19 through 2-36).

1. THREADING OPERATION (CASSETTE IN→CASSETTE DOWN→FR STOP POSITION)

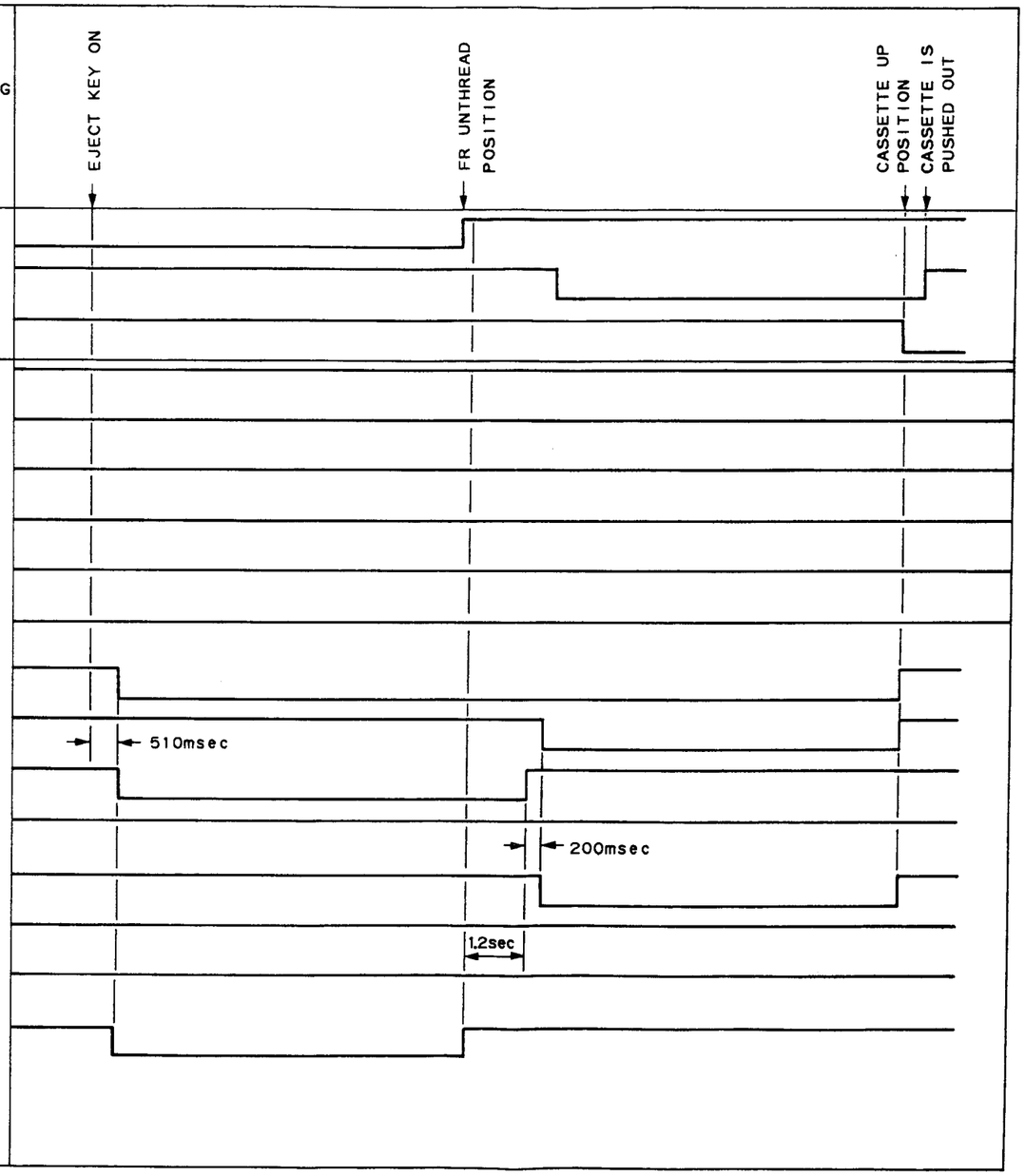
	SIGNAL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT
INPUT	H : CASSETTE DOWN	08 — DIGIT 3	IC7-18
	H : CASSETTE IN	08 — DIGIT 4	IC7-17
	L : THREAD END	0L — DIGIT 4	IC7-5
	L : UNTHREAD END	0L — DIGIT 3	IC7-6
OUTPUT	FWD / $\overline{\text{REV}}$	00 — DIGIT 1	IC7-41
	NORMAL / $\overline{\text{SEARCH}}$	00 — DIGIT 2	IC7-40
	H : DRUM STOP	01 — DIGIT 1	IC7-45
	L : SKEW SOL.ON	02 — DIGIT 2	IC7-48
	L : SEARCH SOL.ON	04 — DIGIT 2	IC7-23
	L : PINCH SOL.ON	04 — DIGIT 3	IC7-22
	L : T-BRAKE SOL.ON	05 — DIGIT 1	IC7-37
	L : S-BRAKE SOL.ON	05 — DIGIT 2	IC7-36
	L : T-IDLER SOL.ON	05 — DIGIT 3	IC7-35
	L : S-IDLER SOL.ON	05 — DIGIT 4	IC7-34
	L : C.C.UP	07 — DIGIT 1	IC7-16
	L : C.C.DOWN	07 — DIGIT 2	IC7-15
	L : THREAD MOTOR ON	07 — DIGIT 3	IC7-14
	L : UNTHREAD MOTOR ON	07 — DIGIT 4	IC7-13
			ON SY BOARD



C.C. = CASSETTE UP COMPARTMENT

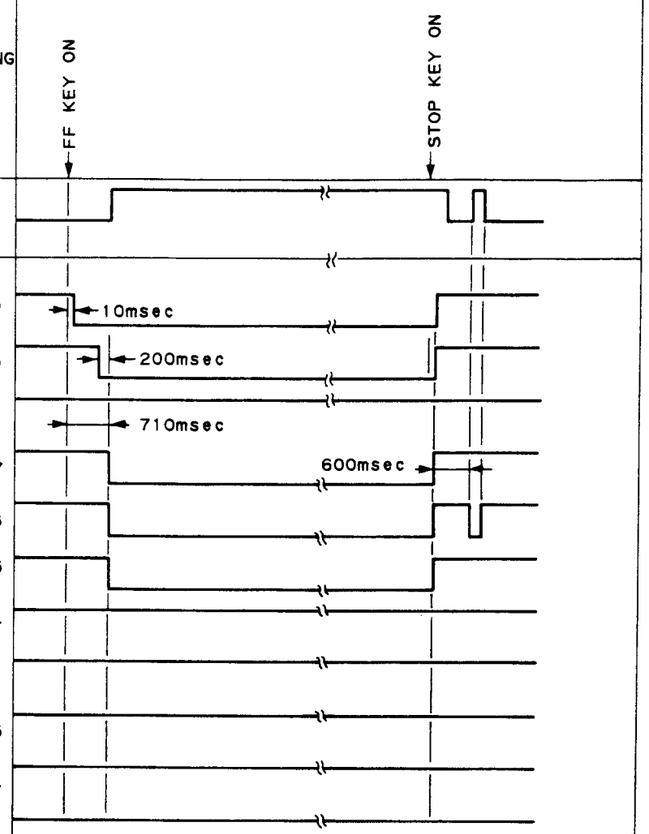
2. UNTHREADING OPERATION (FR STOP POSITION → FR UNTHREAD END POSITION → CASSETTE UP)

	SIGNAL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT
INPUT	L : FR UNTHREAD END	08 — DIGIT 2	IC7-19
	H : CASSETTE DOWN	08 — DIGIT 3	IC7-18
	H : CASSETTE IN	08 — DIGIT 4	IC7-17
OUTPUT	FWD / $\overline{\text{REV}}$	00 — DIGIT 1	IC7-41
	NORMAL / $\overline{\text{SEARCH}}$	00 — DIGIT 2	IC7-40
	H : DRUM STOP	01 — DIGIT 1	IC7-45
	L : SKEW SOL.ON	02 — DIGIT 2	IC7-48
	L : SEARCH SOL.ON	04 — DIGIT 2	IC7-23
	L : PINCH SOL.ON	04 — DIGIT 3	IC7-22
	L : T-BRAKE SOL.ON	05 — DIGIT 1	IC7-37
	L : S-BRAKE SOL.ON	05 — DIGIT 2	IC7-36
	L : T-IDLER SOL.ON	05 — DIGIT 3	IC7-35
	L : S-IDLER SOL.ON	05 — DIGIT 4	IC7-34
	L : C.C.UP	07 — DIGIT 1	IC7-16
	L : C.C.DOWN	07 — DIGIT 2	IC7-15
	L : THREAD MOTOR ON	07 — DIGIT 3	IC7-14
	L : UNTHREAD MOTOR ON	07 — DIGIT 4	IC7-13
			ON SY BOARD



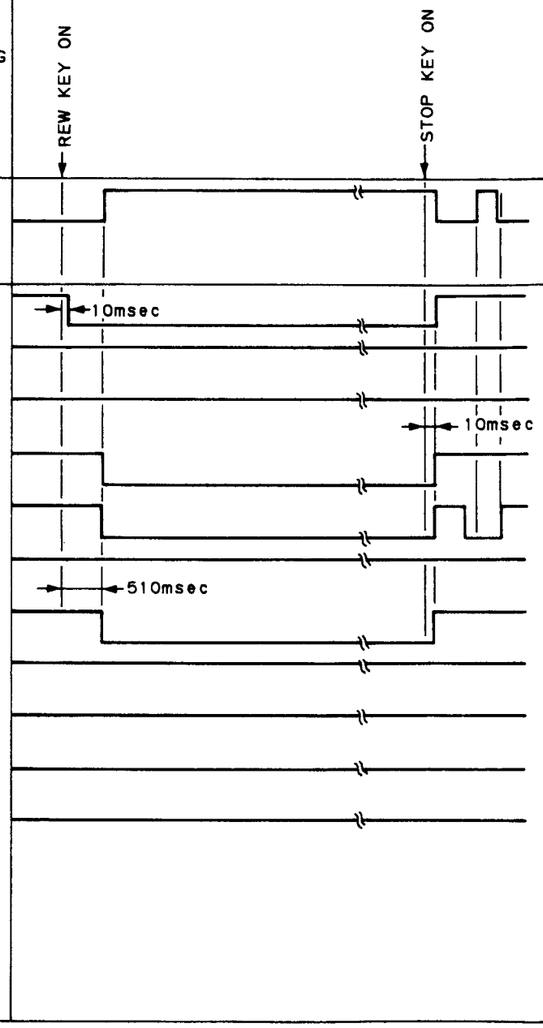
3. FF MODE (FR STOP→FF→FR STOP)

	SIGNRL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT
INPUT	L : REEL STOP	09 — DIGIT 2	
OUTPUT	H : DRUM STOP	01 — DIGIT 1	IC7-45
	L : SEARCH SOL.ON	04 — DIGIT 2	IC7-23
	L : PINCH SOL.ON	04 — DIGIT 3	IC7-22
	L : T-BRAKE SOL.ON	05 — DIGIT 1	IC7-37
	L : S-BRAKE SOL.ON	05 — DIGIT 2	IC7-36
	L : T-IDLER SOL.ON	05 — DIGIT 3	IC7-35
	L : S-IDLER SOL.ON	05 — DIGIT 4	IC7-34
	L : C.C.UP	07 — DIGIT 1	IC7-16
	L : C.C.DOWN	07 — DIGIT 2	IC7-15
	L : THREAD MOTOR ON	07 — DIGIT 3	IC7-14
	L : UNTHREAD MOTOR ON	07 — DIGIT 4	IC7-13
			ON SY BOARD



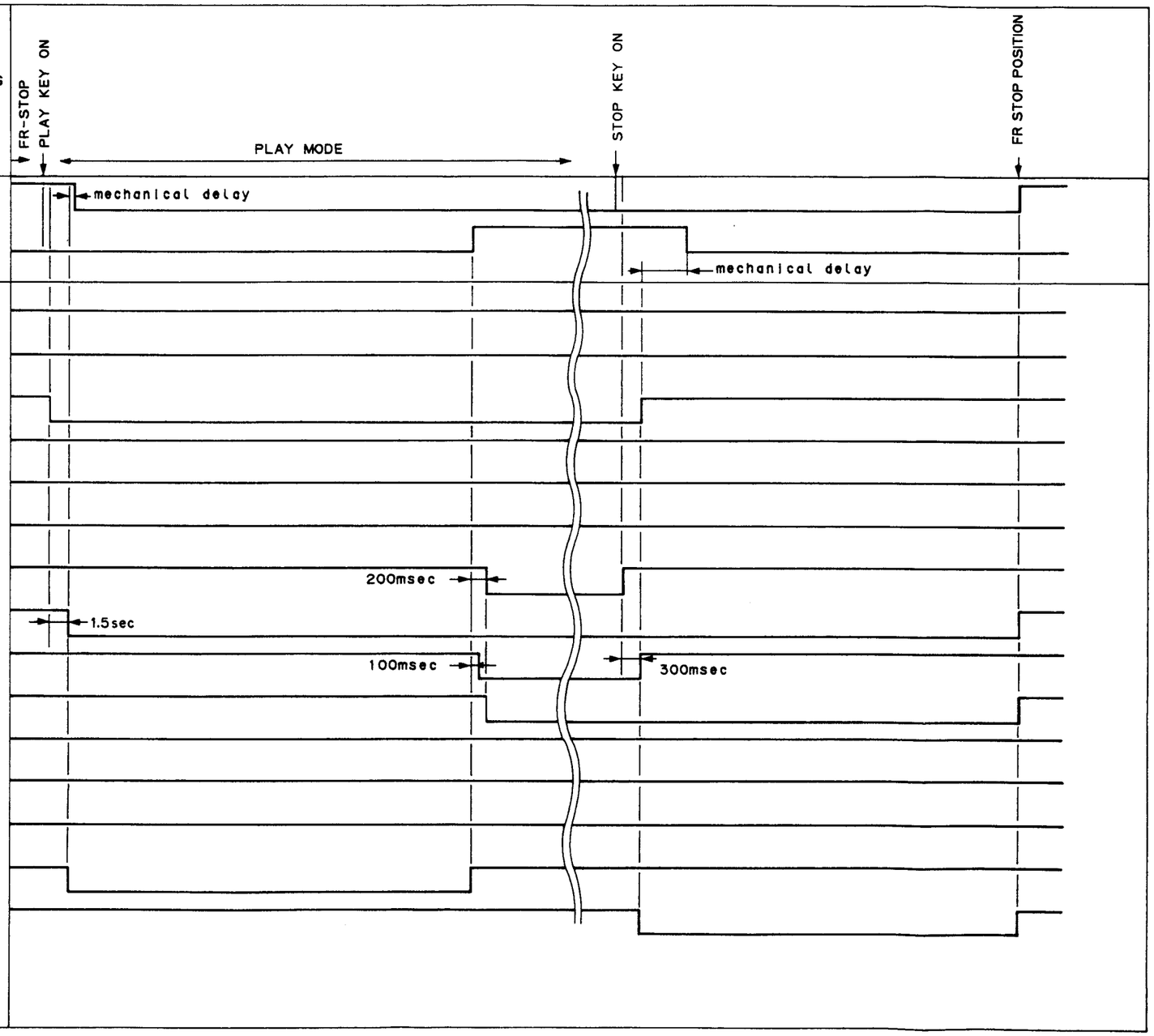
4. REW MODE (FR STOP→REW→FR STOP)

	SIGNAL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT	
INPUT	L : REEL STOP	09 — DIGIT 2		
OUTPUT	H : DRUM STOP	01 — DIGIT 1	IC7-45	
	L : SEARCH SOL.ON	04 — DIGIT 2	IC7-23	
	L : PINCH SOL.ON	04 — DIGIT 3	IC7-22	
	L : T-BRAKE SOL.ON	05 — DIGIT 1	IC7-37	
	L : S-BRAKE SOL.ON	05 — DIGIT 2	IC7-36	
	L : T-IDLER SOL.ON	05 — DIGIT 3	IC7-35	
	L : S-IDLER SOL.ON	05 — DIGIT 4	IC7-34	
	L : C.C. UP	07 — DIGIT 1	IC7-16	
	L : C.C. DOWN	07 — DIGIT 2	IC7-15	
	L : THREAD MOTOR ON	07 — DIGIT 3	IC7-14	
	L : UNTHREAD MOTOR ON	07 — DIGIT 4	IC7-13	
			ON SY BOARD	

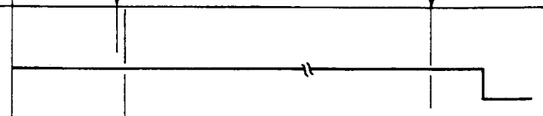


5. PLAY MODE (FR STOP→PLAY→FR STOP)

	SIGNAL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT
INPUT	L : THREAD END	0L — DIGIT 4	IC7-5
	L : UNTHREAD END	0L — DIGIT 3	IC7-6
OUTPUT	FWD / $\overline{\text{REV}}$	00 — DIGIT 1	IC7-41
	NORMAL / $\overline{\text{SEARCH}}$	00 — DIGIT 2	IC7-40
	H : DRUM STOP	01 — DIGIT 1	IC7-45
	L : SKEW SOL.ON	02 — DIGIT 2	IC7-48
	H : REEL STILL	03 — DIGIT 3	IC7-58
	L : SEARCH SOL.ON	04 — DIGIT 2	IC7-23
	L : PINCHH SOL.ON	04 — DIGIT 3	IC7-22
	L : T-BRAKE SOL.ON	05 — DIGIT 1	IC7-37
	L : S-BRAKE SOL.ON	05 — DIGIT 2	IC7-36
	L : T-IDLER SOL.ON	05 — DIGIT 3	IC7-35
	L : S-IDLER SOL.ON	05 — DIGIT 4	IC7-34
	L : C.C UP	07 — DIGIT 1	IC7-16
	L : C.C DOWN	07 — DIGIT 2	IC7-15
	L : THREAD MOTOR ON	07 — DIGIT 3	IC7-14
	L : UNTHREAD MOTOR ON	07 — DIGIT 4	IC7-13
			ON SY BOARD

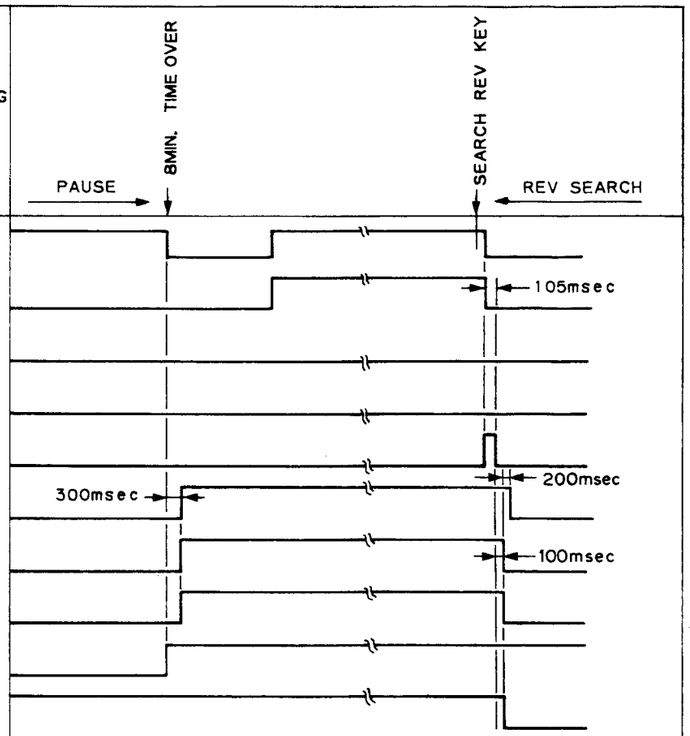


6. PLAY→FWD SEARCH→SEARCH PAUSE

	SIGNAL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT	PLAY / FWD SEARCH KEY / FWD SEARCH / PAUSE KEY / PAUSE
INPUT	L : CAPSTAN STOP	0L — DIGIT 1	IC7-8	
OUTPUT	FWD / $\overline{\text{REV}}$	00 — DIGIT 1	IC7-41	
	NORMAL / $\overline{\text{SEARCH}}$	00 — DIGIT 2	IC7-40	
	H : REEL STILL	03 — DIGIT 3	IC7-58	
	L : SEARCH SOL.ON	04 — DIGIT 2	IC7-23	
	L : PINCH SOL.ON	04 — DIGIT 3	IC7-22	
	L : T-BRAKE SOL.ON	05 — DIGIT 1	IC7-37	
	L : S-BRAKE SOL.ON	05 — DIGIT 2	IC7-36	
	L : T-IDLER SOL.ON	05 — DIGIT 3	IC7-35	
	L : S-IDLER SOL.ON	05 — DIGIT 4	IC7-34	
			ON SY BOARD	

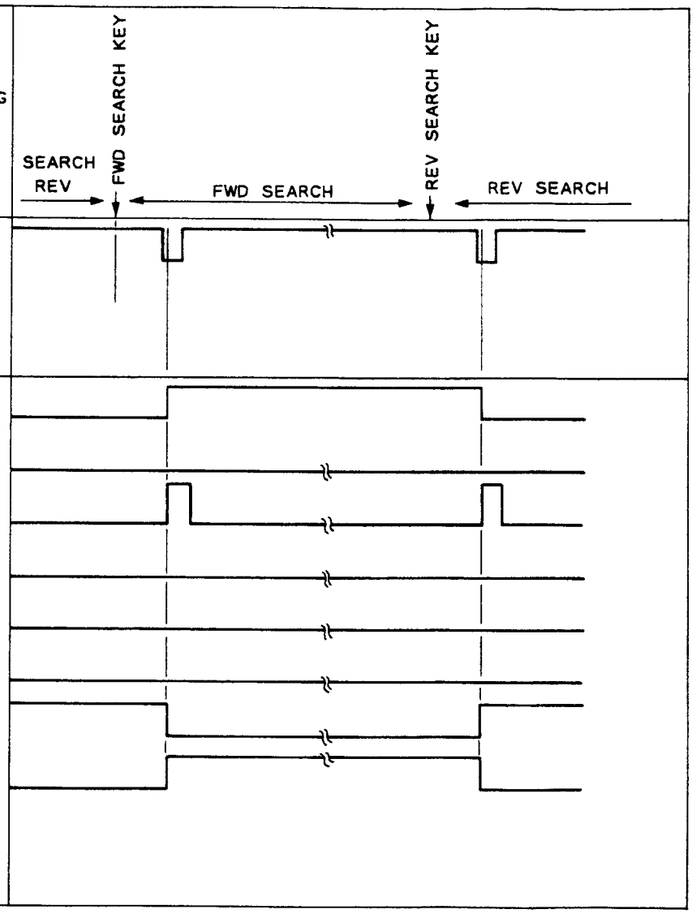
7. PLAY PAUSE→LONG PAUSE→REV SEARCH

	SIGNAL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT
OUTPUT	FWD / $\overline{\text{REV}}$	00 — DIGIT 1	IC7-41
	NORMAL / $\overline{\text{SEARCH}}$	00 — DIGIT 2	IC7-40
	H : DRUM STOP	01 — DIGIT 1	IC7-45
	H : REEL STILL	03 — DIGIT 3	IC7-58
	L : SEARCH SOL.ON	04 — DIGIT 2	IC7-23
	L : PINCH SOL.ON	04 — DIGIT 3	IC7-22
	L : T-BRAKE SOL.ON	05 — DIGIT 1	IC7-37
	L : S-BRAKE SOL.ON	05 — DIGIT 2	IC7-36
	L : T-IDLER SOL.ON	05 — DIGIT 3	IC7-35
	L : S-IDLER SOL.ON	05 — DIGIT 4	IC7-34
			ON SY BOARD



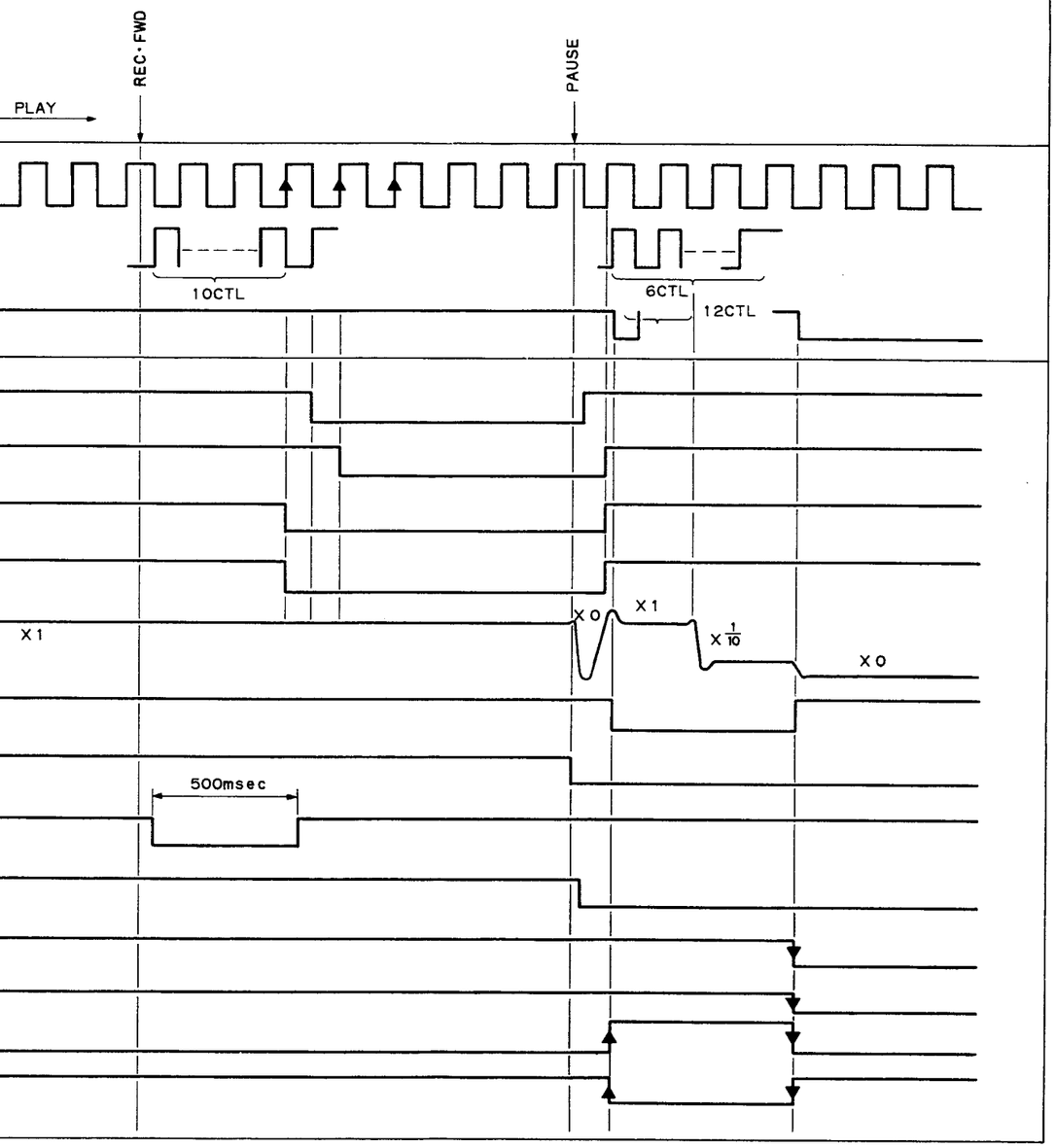
8. REV SEARCH→(FWD PAUSE)→FWD SEARCH→(FWD PAUSE)→REV SEARCH

	SIGNAL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT	
INPUT	L : CAPSTAN STOP	0L — DIGIT 1	IC7-8	
OUTPUT	FWD / $\overline{\text{REV}}$	00 — DIGIT 1	IC7-41	
	NORMAL / $\overline{\text{SEARCH}}$	00 — DIGIT 2	IC7-40	
	H : REEL STILL	03 — DIGIT 3	IC7-58	
	L : SEARCH SOL.ON	04 — DIGIT 2	IC7-23	
	L : T-BRAKE SOL.ON	05 — DIGIT 1	IC7-37	
	L : S-BRAKE SOL.ON	05 — DIGIT 2	IC7-36	
	L : T-IDLER SOL.ON	05 — DIGIT 3	IC7-35	
	L : S-IDLER SOL.ON	05 — DIGIT 4	IC7-34	
			ON SY BOARD	



9. FWD→(DUB FWD)→REC FWD→REC FWD PAUSE

	SIGNAL	LABEL NUMBER ON DIAGNOSTICS	MEASURING POINT
INPUT	1/2VD		IC7-3
	PB CTL		IC7-28
	L : CAPSTAN STOP	0L—DIGIT 1	IC7-8
OUTPUT	L : VIDEO CH-B REC	02—DIGIT 3	IC7-47
	L : VIDEO CH-A REC	02—DIGIT 4	IC7-46
	L : AUDIO CH-1 REC	01—DIGIT 4	IC7-42
	L : AUDIO CH-2 REC	01—DIGIT 3	IC7-43
	CAPSTAN SPEED	———	———
	FWD/$\overline{\text{REV}}$	00—DIGIT 1	IC7-41
	NORMAL/$\overline{\text{SEARCH}}$	00—DIGIT 2	IC7-40
	L : SKEW SOL. ON	02—DIGIT 2	IC7-48
	L : SEARCH SOL. ON	04—DIGIT 2	IC7-23
	L : T-BRAKE SOL. ON	05—DIGIT 1	IC7-37
	L : S-BRAKE SOL. ON	05—DIGIT 2	IC7-36
	L : T-IDLER SOL. ON	05—DIGIT 3	IC7-35
	L : S-IDLER SOL. ON	05—DIGIT 4	IC7-34



2-12. FIXTURE

Part No.	Description
J-6001-820-A	Drum Eccentricity Gauge (3)
J-6001-830-A	Drum Eccentricity Gauge (2)
J-6001-840-A	Drum Eccentricity Gauge (1)
J-6001-930-A	Drum Eccentricity Gauge (4)
J-6009-830-A	Flatness Plate
J-6026-240-A	Adjustment Driver
J-6130-010-A	Reel Table Height Check Base Jig
J-6130-020-A	Reel Table Height Check Jig
J-6153-020-A	Dihedral Adjustment Driver
J-6150-140-A	Eccentricity Screwdriver
J-6153-580-A	Pinch Lever Adjustment Jig
Y-2031-001-0	Cleaning Fluid
2-034-697-00	Cleaning Piece
3-702-216-01	Back Tension Adjustment Jig
7-661-018-01	Sony Oil
7-732-050-20	Tension Scale (50g)
7-732-050-30	Tension Scale (100g)
7-732-050-40	Tension Scale (200g)
7-732-050-50	Tension Scale (500g)
8-899-999-53	Torque Measurement Tape
8-960-020-62	Alignment Tape, RR5-2SB PAL
8-960-035-61	Alignment Tape, RR5-2SC PAL
8-960-036-02	Alignment Tape, RR2-1SD PAL
8-960-036-80	Alignment Tape, RR5-1SD PAL
9-911-053-00	Thickness Gauge

SECTION 3
PERIODIC CHECK AND MAINTENANCE

It is recommended that the following maintenance and the periodic check be performed as refering to the Hours Meter of the front panel for the best operation of the function and performance of the unit and for prolonging the live of the unit and the tape.

3-1. MAINTENANCE AFTER REPAIRS

Perform the following maintenance after repairs regardless of the operating hours of the unit.

(1) Cleaning of the video heads
- . Press a cleaning piece moistened with cleaning fluid to the drun and turn it slowly with the hand. (Never turn the motor with electric power to clean.)
- . Never move the cleaning piece in a vertical direction of the head tip during cleaning. It might damage the head tips.

(2) Cleaning of the tape path system
- . Wipe the tape bearing surfaces (such as tape guides, drum, capstan, and pinch roller) with a cleaning piece moistened with cleaning fluid.

(3) Cleaning of the drive system
- . Wipe the drive system (such as belt, idler, and reel table surface) with a cleaning piece moistened with cleaning fluid.

3-2. PERIODIC CHECK

Perform the maintenance checks described separately in accordance with the operational hours of the unit.

3-3. OTHERS

(1) Sony Oil
- . Be sure to use Sony Oil as the lubrication oil. (If any other oil is used, various troubles might occur because of different viscosity.)

Sony Oil : Part No. 7-661-018-01
- . Use Sony Oil in which dust or other foreign material have not been mixed for lubricating the bearing. (If foreign material is in the oil, wear or burning of the bearing might occur.)

(2) Grease

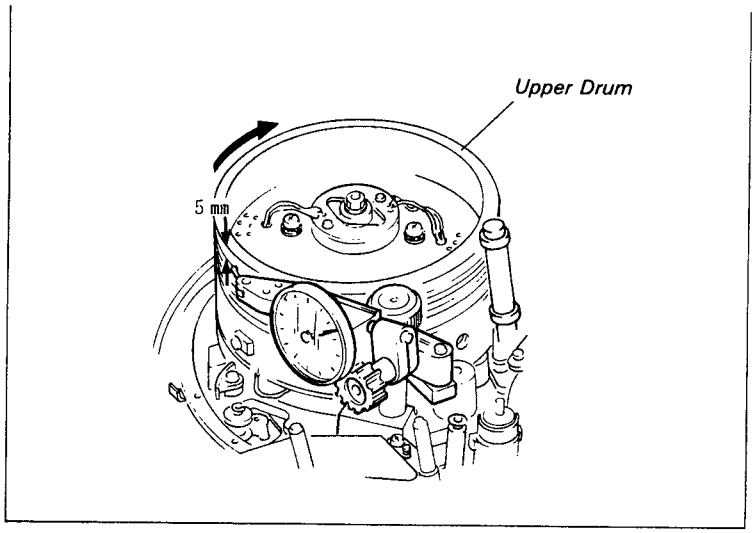
Be sure to use the following grease.

Sony grease : Part No. 7-662-001-62 (SGL-501)

(3) Overhaulling of the equipment

When overhaulling the equipment is attempted, replace parts at the intervals indicated in the chart on page 3-2. For parts not in the list, such as motors and heads, refer the following items. (It supporse the usualy state of use.)
- . Reel motor : about 3,000 H
- . Capstan motor : about 3,000 H
- . Threading motor : about 30,000 times
- . Cassette-up compartment motor : about 30,000 times
- . Audio/CTL head : about 3,000 H
- . CTL head : about 3,000 H
- . Full erase head : about 3,000 H

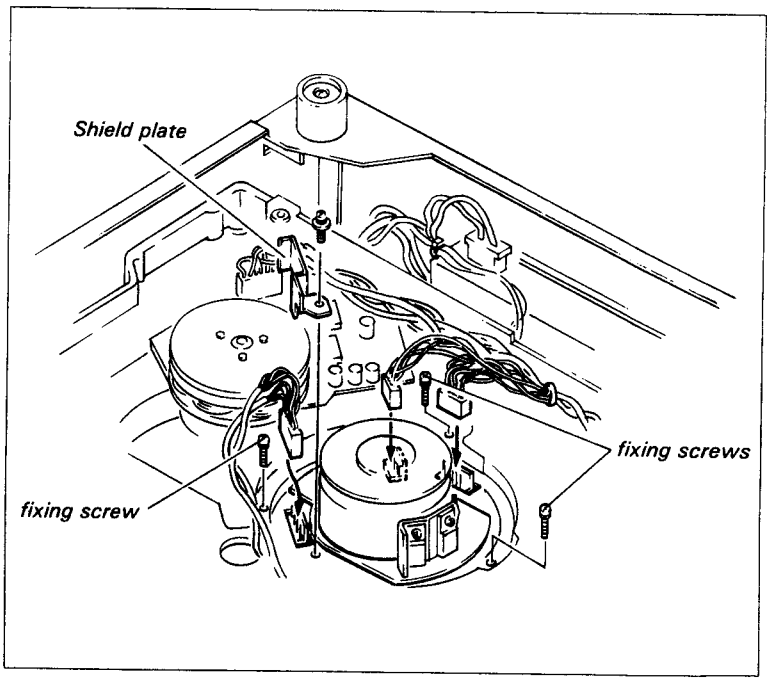
(4) Tap the inside of the Upper Drum with a nylon hammer or a screwdriver handle until the gauge deflection remains within 5 microns.
(5) After the adjustment, alternately tighten the two fixing screws of the Upper Drum. (Tightening torque: 14 to 16 kg-cm)
(6) After tightening the screws, check that the gauge deflection is within 5 microns.
(7) Solder the four leads from the video heads to the printed circuit board as shown in the figure.
(8) Install the S Guard Block. (Insert the connector at the bottom of the S Guard Block securely into the connector on the chassis.)
(9) Adjust as described in Section 4-11.



4-2. REPLACEMENT OF THE DRUM ASSEMBLY

Replacement procedure:

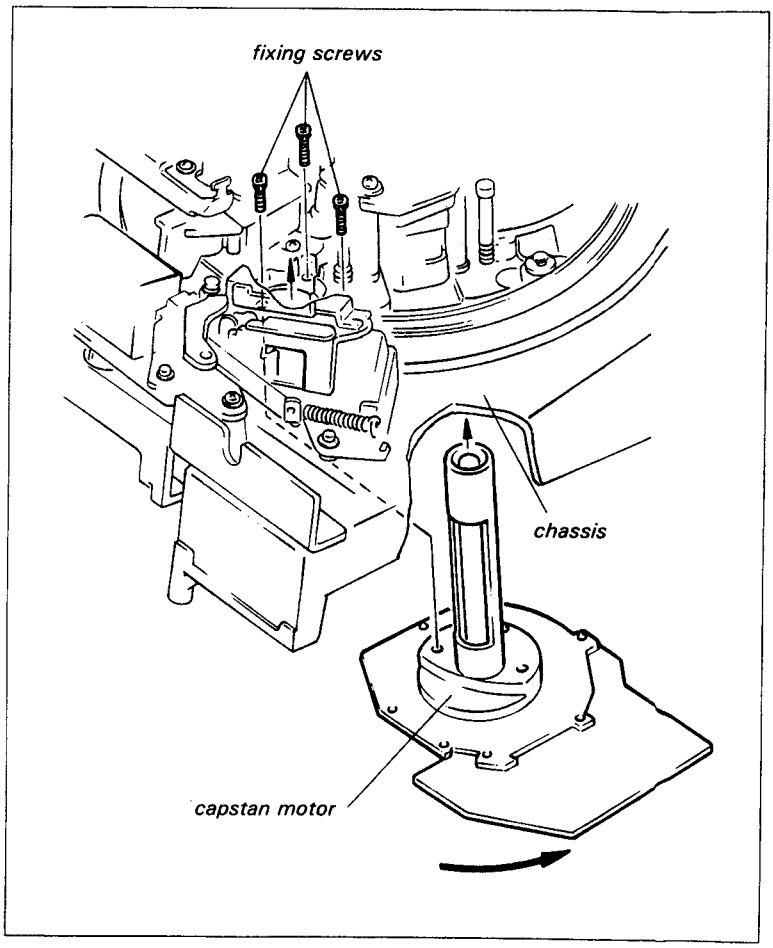
(1) Remove the Shield Plate.
(2) Disconnect the three connectors of the drum assembly on the back of the unit.
(3) Remove the three fixing screws which hold the drum.
(4) Install the drum on the base while turning the drum assembly in the clockwise direction when viewed from top of the unit.
(5) Connect the three connectors.
(6) Tighten the fixing screw of the Shield Plate.
(7) Adjust as descrebed in Section 4-11.



4-3. REPLACEMENT OF THE CAPSTAN MOTOR

Replacement procedure:

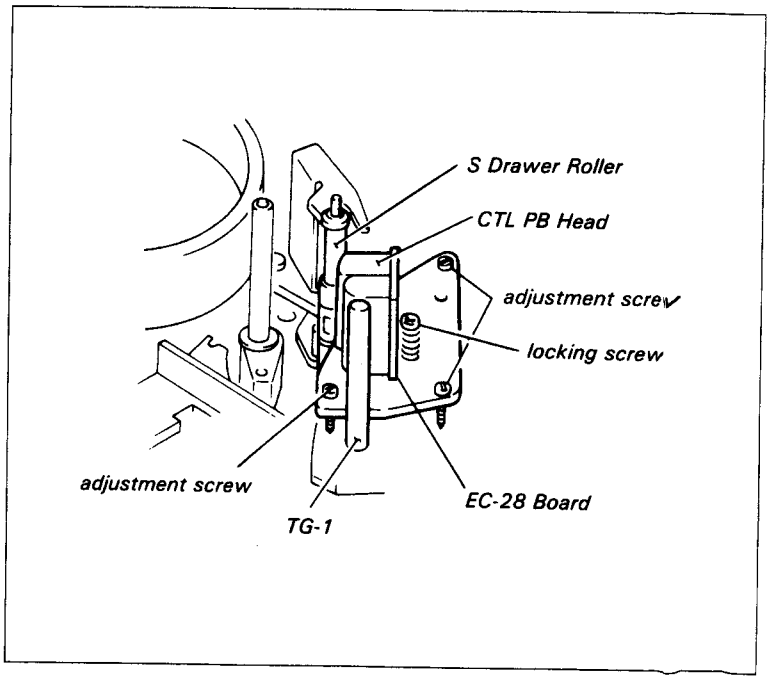
(1) Remove the Capstan Motor from the unit.
(2) Install the new Capstan Motor and thread the three fixing screws snugly but do not tighten them.
(3) Tighten the fixing screws while turning the Capstan Motor in the direction of the arrow.
(4) Adjust as described in Section 4-11.



4-4. REPLACEMENT OF THE CTL PB / FULL ERASE HEAD

Replacement procedure:

(1) Disconnect CN341 and CN342 on the EC-28 Board.
(2) Remove the locking screw and remove the CTL PB / Full Erase Head Block from the unit. Never tighten or loosen the three adjustment screws.
(3) Remove the two fixing screws at the bottom of the bracket and remove the head.
(4) Remove the EC-28 Board from the head and solder it to the new head.
(5) Perform steps (1) to (4) in reverse order.
(6) Adjust as described in Section 4-11.



4-5. REPLACEMENT OF THE S DRAWER ROLLER

Replacement procedure:

(1) Put the unit into the EJECT completion mode without a cassette tape.

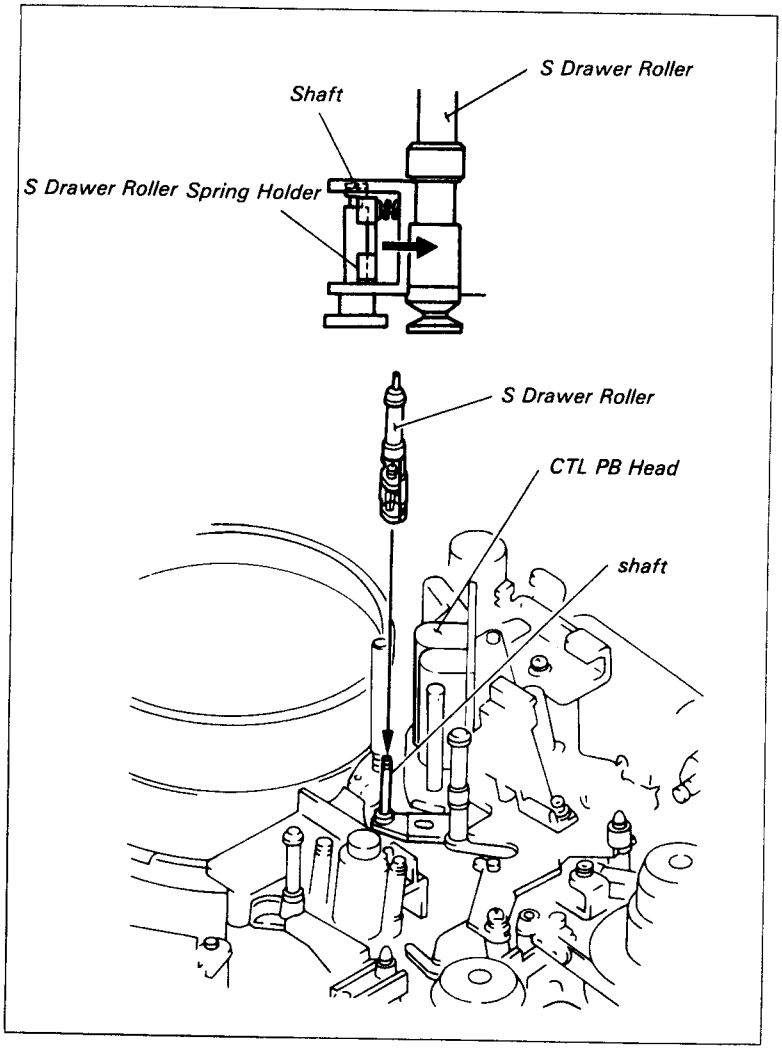
(2) Turn the pulley of the Gear Box by hand until the S Drawer Roller comes in front of the CTL PB Head.

(3) Remove the S Drawer Roller from the shaft while pushing the spring holder in the direction of the arrow.

(4) Smear a little Sony Grease in the notch at the bottom of the new S Drawer Roller.

(5) While pushing the spring holder in the direction of the arrow, install the new S Drawer Roller onto the shaft until the S Drawer Roller locks to the shaft.

(6) Adjust as described in Section 4-11.



4-6. REPLACEMENT / ADJUSTMENT OF THE TAPE GUIDES ON THE THREADING RING

. There are three tape guides on the Threading Ring. This section describes the replacement of the three tape guides and the width adjustment of the two tape guides.

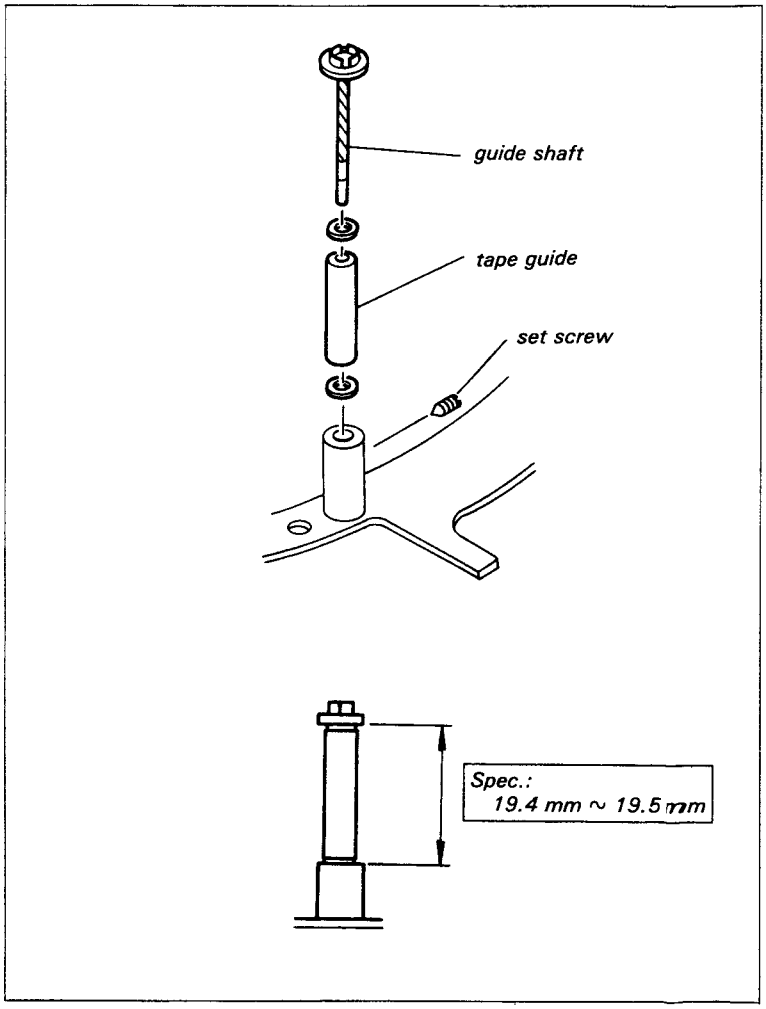
tool: slide vernier callipers of equivalent
L-shaped hexagonal wrench
(across flat has 1.27 mm)

Replacement procedure:

(1) Loosen the set screw of the boss and remove the guide shaft.
(2) Clean the guide shaft with a cloth moistened with cleaning fluid.
(3) Assemble the guide.
(4) Adjust the height of the sub-ring guide as shown in the figure.
(5) Adjust as described in Section 4-11.

Adjustment procedure:

(1) Adjust the height of the tape guide and tighten the set screw of the boss. Check that the guide roller turns smoothly.
(2) Insert the cassette tape and put the unit into the PLAY mode. Check that the tape runs along the upper flange of the tape guide without curling.
(3) Adjust as described in Section 4-11.



4-7. Replacement of the Audio/CTL Head

Replacement procedure:

(1) Remove the Audio/CTL Head Block from the unit after removing the three fixing screws as shown in the figure.

(2) Remove the Audio/CTL Head and the shield case (F and B) after removing the two fixing screws as shown in the figure.

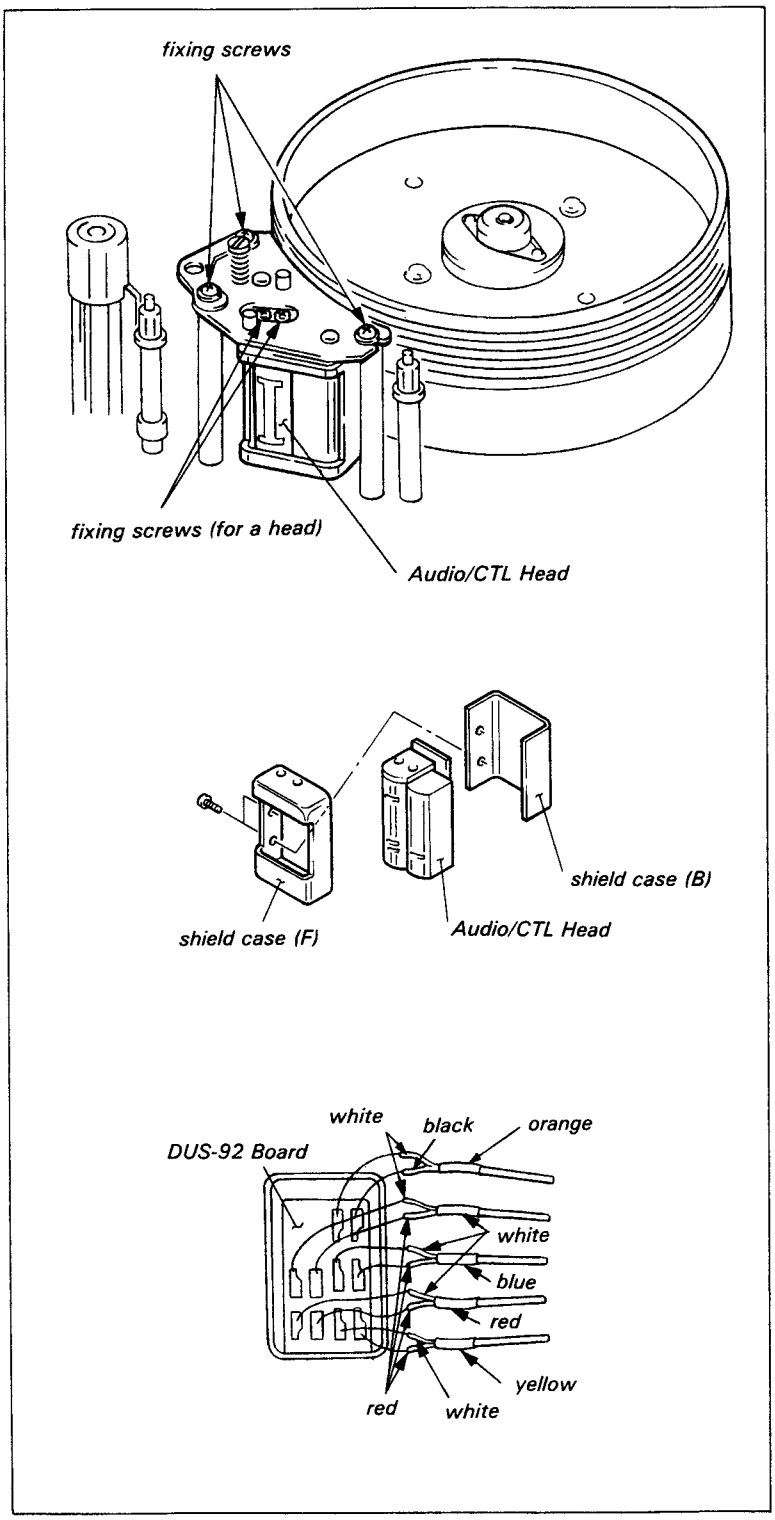
(3) Remove the two fixing screws from the shield case.

(4) Unsolder the ten leads from the printed circuit board and remove the DUS-92 Board from the head.

(5) Replace the head with a new one and solder the leads to the DUS-92 Board as shown in the figure.

(6) Perform steps (1) to (3) in reverse order.

(7) Adjust as described in Section 4-11.



4-8. REPLACEMENT OF THE THREADING RING

Replacement procedure:

(1) Remove the E Head Base Block from the unit after removing the three fixing screws.

(2) Remove the S Guard Assembly and the FR Detector from the unit.

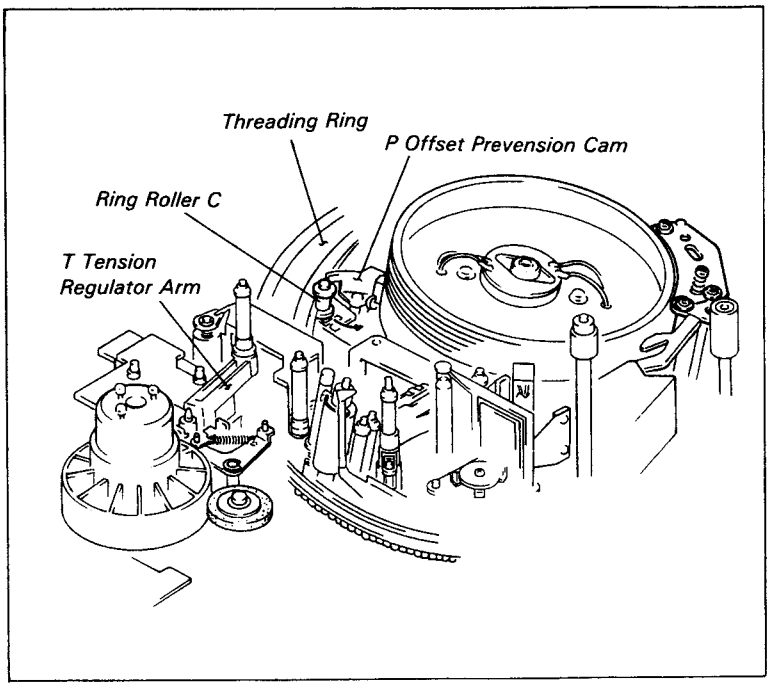
(3) Loosen the two fixing screws from the Threading Gear Block and remove it from the Threading Ring.

(4) Loosen the fixing screw and then move the Ring Roller (C) and the P Offset Prevention Cam in the direction of the arrow.

(5) Remove the Threading Ring from the unit and replace it with a new one.

(6) Perform steps (1) to (4) in reverse order.

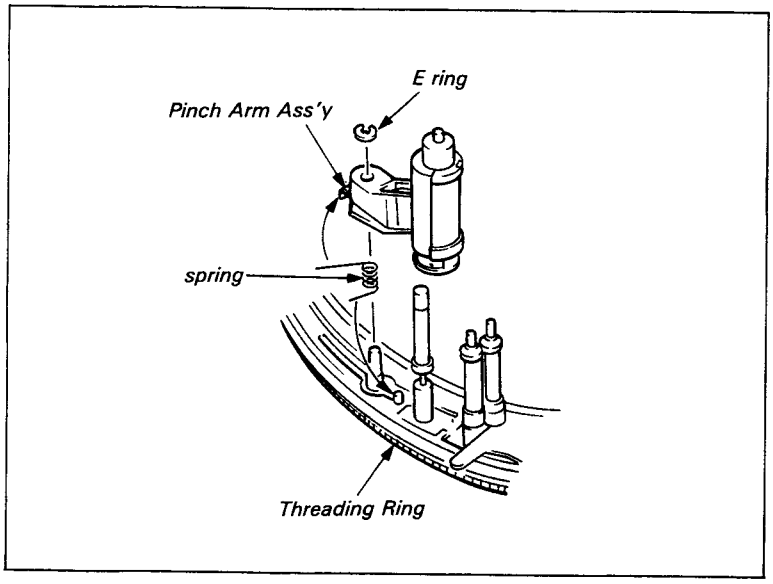
(7) Adjust as described in Section 4-11.



4-9. REPLACEMENT OF THE PINCH ROLLER

Replacement procedure:

(1) Turn the pulley of the Gear Box until the S Drawer Roller is in front of the CTL PB Head.
(2) Remove the Pinch Arm Assembly from the Threading Ring after removing the E ring.
(3) Replace the Pinch Roller Assembly with a new one.
(4) Install the Pinch Roller Assembly on the Threading Ring as shown in the figure.
(5) Adjust as described in Section 4-11.

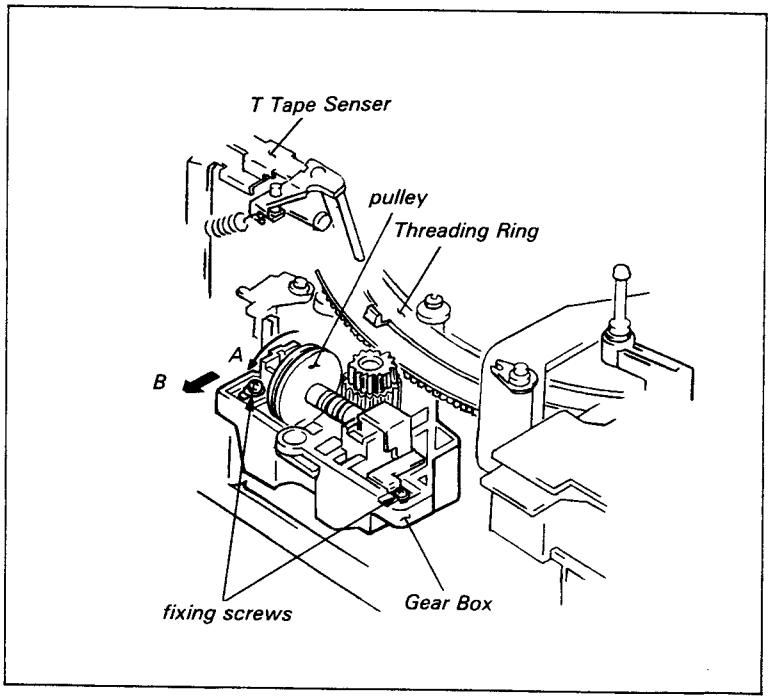


4-10. REPLACEMENT OF THE THREADING GEAR BOX SYSTEM

4-10-1. Replacement of the Threading Gear Box

Replacement procedure:

(1) Put the unit into the EJECT mode and turn the power OFF.
(2) Remove the T Tape Sensor from the gear box after removing the fixing screw.
(3) Remove the two fixing screws of the gear box after turning the pulley 1 revolution in the direction of arrow A. Move the gear box in the direction of arrow B and remove it from the unit.
(4) Remove the harness from the clamper and disconnect CN511 from the SY-106 Board.
(5) Replace the gear box with a new one.
(6) Perform steps (3) and (4) in reverse order.
(7) Put the gear box on the chassis and thread the two fixing screws snugly but do not tighten them. Tighten the two fixing screws of the gear box after meshing the Threading Ring to the gear.
(8) Adjust as described in Section 4-11.



4-10-2. Replacement of the Threading Motor

Tool: L-shaped hexagonal wrench
(across flat has 1.5 mm)

Replacement procedure:

(1) Perform steps (1) to (4) of Section 4-10-1, Replacement of the Threading Gear Box.

(2) Remove the gear after removing the stop ring.

(3) Remove the belt from the motor pulley. Remove the plate from the frame after removing the fixing screw.

(4) Remove the pulley while pushing the hook in the direction of the arrow as shown in the figure.

(5) Remove the motor block from the frame after removing the two fixing screws.

(6) Loosen the set screw and remove the motor pulley.

(7) Remove the motor from the motor bracket after removing the two fixing screws.

(8) Remove the shield case and unsolder the LM-13 Board. Replace the motor with a new one.

(9) The pole of the motor is as shown in the figure. Solder the plus terminal of the motor to the plus pad of the LM-13 Board.

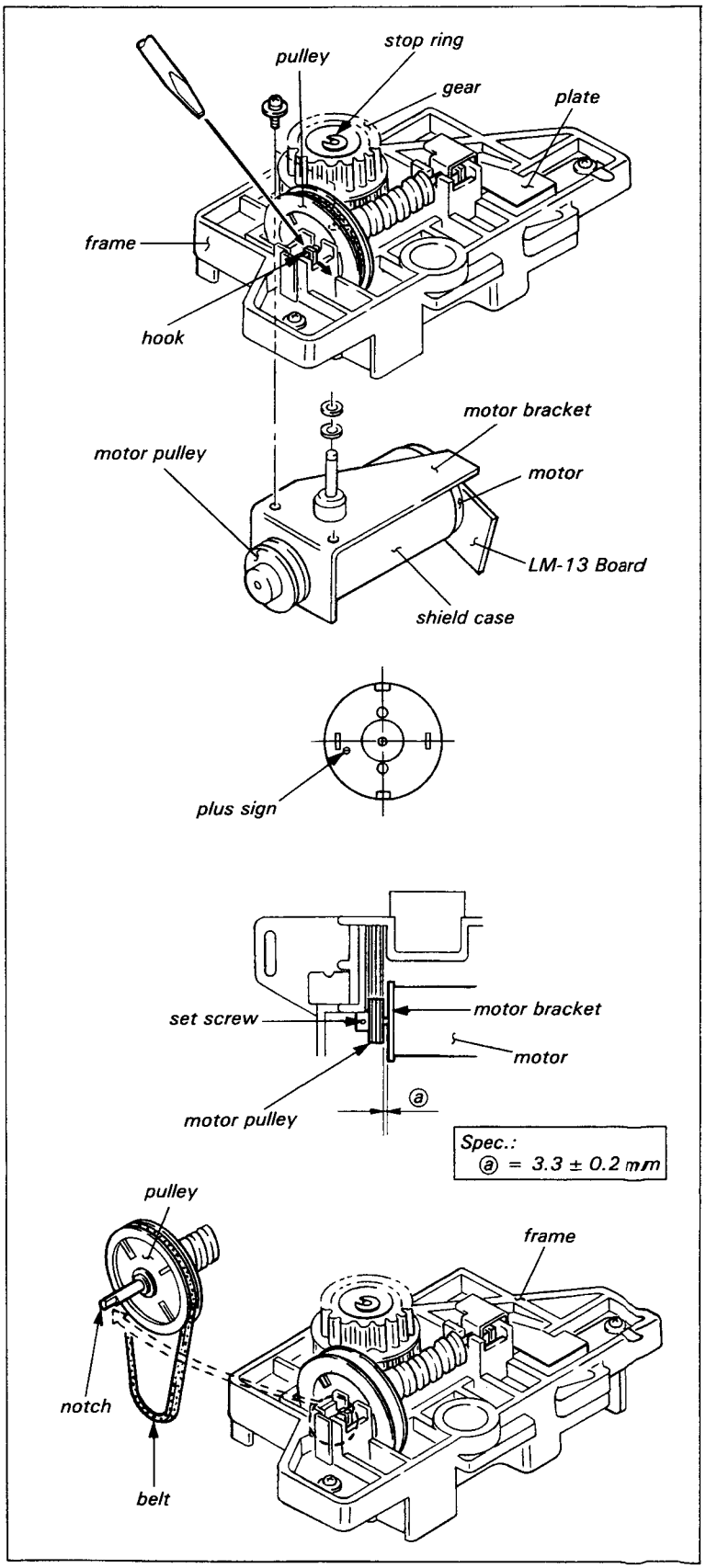
(10) Install the shield case to the motor.

(11) Install the motor to the frame as shown in the figure. Peform steps (4) to (6) in reverse order. Check that the clearance between the motor pulley and the bracket meets the required specification.

(12) Hook the belt to the pulley and install the pulley on the frame. Be sure that the orientation of the notch of the pulley shaft is as shown in the figure.

(13) Hook the belt to the motor pulley. Check that the belt is not twisted.

(14) Check as described in Section 4-11.



4-10-3. Replacement of the Threading Belt

Replacement procedure:

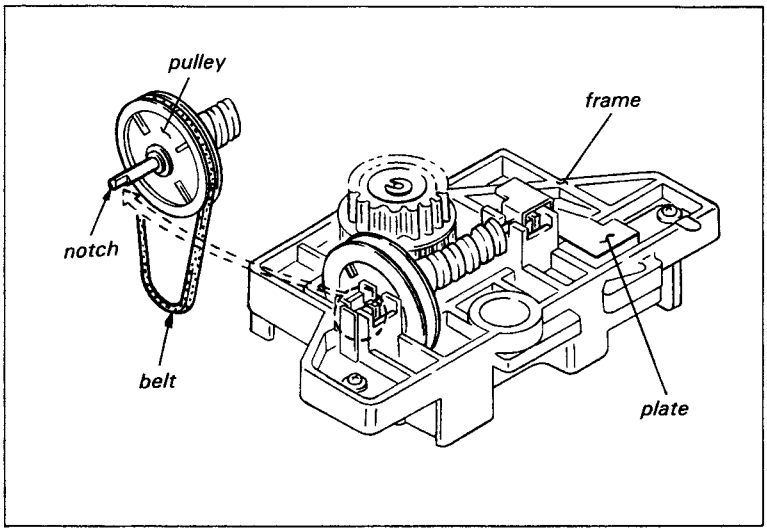
(1) Perform steps (1) to (3) in Section 4-10-2, Replacement of the Threading Motor.

(2) Clean the new belt and the groove of the pulley with a cloth moistened with cleaning fluid.

(3) Hook the belt to the pulley and install them to the frame. Be sure that the orientation of the notch of the pulley shaft is as shown in the figure.

(4) Install the plate to the frame and hook the belt to the Motor pulley. Check that the belt is not twisted.

(5) Check as described in Section 4-11.



4-11. ITEMS TO BE ADJUSTED AFTER MAIN PARTS REPLACEMENT

(Nambers in parenthesis refer to Section Nos.)

Replacement of Threading Ring

Threading Ring Rotation Adjustment (5-3-1) → Gear Box Position Adjustment (5-3-2) → FR Detector Block Mounting Position Adjustment (5-3-4) → Pinch Roller Position Adjustment (5-3-3) → Pinch Lever Pre-set Adjustment (5-4-1) → Pinch Roller Pre-set Adjustment (5-4-2) → Leaf Spring Position Adjustment (5-9) → F FWD/REW Modes Tape Path Adjustment (7-1) → T Correction Guide Slantness Adjustment (7-2) → Tape Path Adjustment Around Pinch Roller (7-6) → PLAY Mode Tape Path Adjustment (1) (7-3) → PLAY Mode Tape Path Adjustment (2) (7-4) → REV Mode Tape Path Adjustment (7-5) → Video Tracking Adjustment (7-7-1) → CTL PB Head Height/Azimuth/Zenith Adjustments (7-7-2) → Video Tracking Adjustment (check) (7-7-1)

Replacement of Pinch Roller

Pinch Roller Self Alignment Adjustment (5-3-3) → Pinch Roller Pre-set Adjustment (5-4-2) → → PLAY Mode Tape Path Adjustment (2) (7-4) → REV Mode Tape Path Adjustment (7-5) → → Tape Path Adjustment Around Pinch Roller (7-6) → Video Tracking Adjustment (check)(7-7-1)

Replacement of Take-up Reel Table

Reel Table Height and Vertical Play Adjustment (5-1-2) → T Brake Torque Adjustment (6-1-2) → REW Brake Torque Adjustment (6-1-3) → F FWD/REW Torque Adjustment (6-2) FWD Torque Adjustment (6-3) → F FWD/REW Modes Tape Path Adjustment (7-1)

Replacement of Supply Reel Table

Reel Table Height and Vertical Play Adjustment (5-1-2) → S Brake Torque Adjustment (6-1-1) → F FWD/REW Torque Adjustment (6-2) → REV Torque Adjustment (6-4) → FF Back Tension Adjustment (6-5) → FWD Back Tension Adjustment (6-6) → Video Tracking Adjustment (check) (7-7-1)

Replacement of Brake Band

FF Back Tension Adjustment (6-5) → FWD Back Tension Adjustment (6-6)

Replacement of Capstan Motor

Pinch Lever Right Angle Adjustment (5-10) → Pinch Roller Self Alignment Adjustment (5-3-3) → Capstan Search Speed Adjustment → Capstan FWD/REV Detector Adjustment → Capstan Free Speed Adjustment → Capstan Stop Servo Adjustment → PLAY Mode Tape Path Adjustment (2) (7-4) → REV Mode Tape Path Adjustment (7-5) → Tape Path Adjustment Around Pinch Roller (7-6) → Video Tracking Adjustment (check)(7-7-1)

Replacement of Threading Motor

Gear Box Position Adjustment (5-3-2)

Replacement of Reel Motor

FWD Torque Adjustment (6-3) ⟶ REV Torque Adjustment (6-4)

Replacement of CTL PB Head

CTL PB Head Height/AZimuth/Zenith Adjustments (7-7-2) ⟶ Video Tracking Adjustment (check) (7-7-1)

Replacement of Audio/CTL Head

Audio Head Height Adjustment (7-7-3) ⟶ Audio Head Azimuth Adjustment (7-7-5) ⟶ Video Tracking Adjustment (7-7-1) ⟶ Audio Head Height Adjustment (7-7-3) ⟶ Audio Head Azimuth Adjustment (7-7-5) ⟶ Audio Head Phase Adjustment (7-7-6) ⟶ Audio/CTL Head Position Adjustment (7-7-7) ⟶ Audio System Alignment (all of Section 10)

Replacement of Drum Assembly

Tracking Adjustment (7-7) ⟶ F FWD/REW Modes Tape Path Adjustment (7-1) ⟶ PLAY Mode Tape Path Adjustment (2) (7-4) ⟶ REV Mode Tape Path Adjustment (7-5) ⟶ Video Head Dihedral Adjustment (7-8) ⟶ Drum AFC Level Adjustment ⟶ Drum AFC Transient Adjustment ⟶ Switching Position Adjustment

Replacement of Upper Drum Assembly

Replacement of Upper Drum (4-1) ⟶ Tracking Adjustment (7-7) ⟶ F FWD/REW Modes Tape Path Adjustment (7-1) ⟶ PLAY Mode Tape Path Adjustment (2) (7-4) ⟶ REV Mode Tape Path Adjustment (7-5) ⟶ Video Head Dihedral Adjustment (7-8) ⟶ PB RF Amplifier Adjustment

SECTION 5
LINK AND DRIVE SYSTEM ALIGNMENT

5-1. REEL TABLE SYSTEM ADJUSTMENT

5-1-1. Cassette Holder Position Adjustment

Tool: Reel table height check base jig
Thickness gauge
L-shaped hexagonal wrench
(across flat has 1.27 mm)

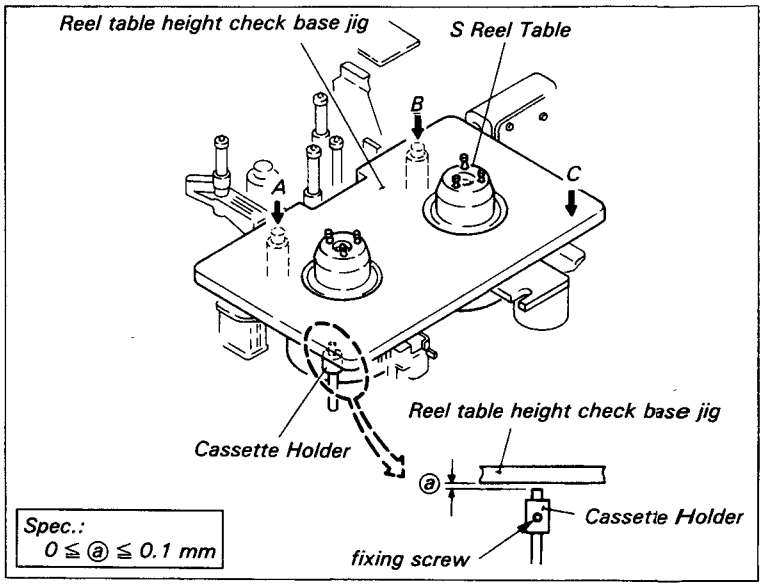
Mode: EJECT completion

Check procedure:

(1) While lightly pushing the Reel Table Height Check Base Jig marked (A), (B) and (C) toward the chassis, check that the clearance between the base jig and the cassette holder meets the required specification.

Adjustment procedure:

(1) Adjust the position of the Cassette Holder to meets the required specification.



5-1-2. Reel Table Height and Vertical Play Adjustment

. The height of the reel table is the reference for the tape threading system and the tape path system. This Adjustment should be performed very carefully.

Tool: Reel table height check base jig
Reel table height check jig
Slide vernier callipers or equivalent

Mode: EJECT completion

Check procedure:

(1) The probes of the Reel Table Height Check Jig marked "SO" and "TO" can slide over the reel table, leaving a clerarnce between the jig and the reel table. The probes marked "SX" and "TX" meet the flange and cannot slide over the reel table.
   . Use the "SO" and "SX" probes for the Supply Reel Table.
   . Use the "TO" and "TX" probes for the Take-up Reel Table.

(2) After tighten the fixing screw of the top of the reel table, push up and press down the reel table. Check that the vertical play meets the required specification.

Adjustment procedure:

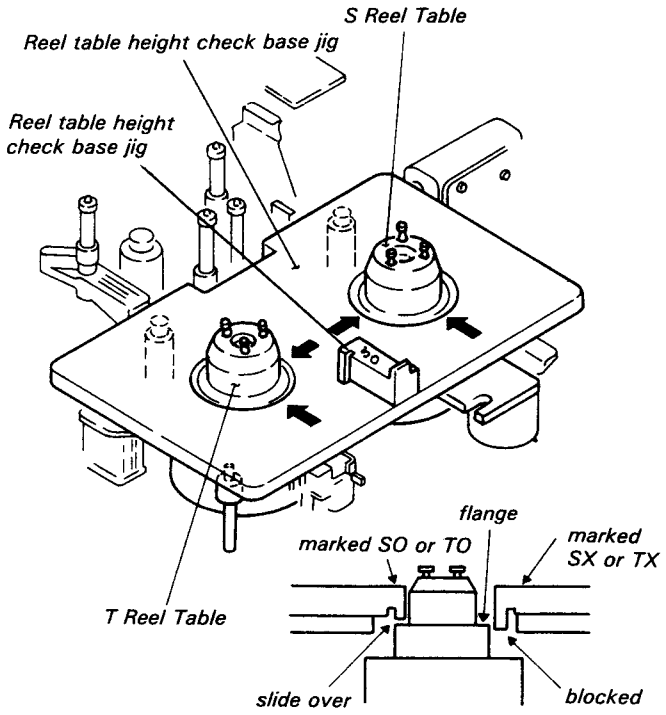
(1) Place the washer under the reel table and adjust the height of the reel table.

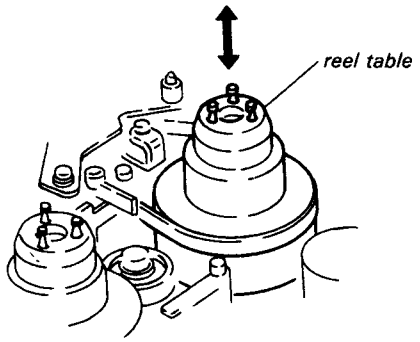
(2) Place the washer on the reel table and adjust the vertical play of the reel table.

NOTE :When the reel table is removed and its height is adjusted with a washer, drop a drop of Sony oil on the reel shaft. (A drop of Sony oil is the amount that is scooped by a 2 mm dia. twing as shown in the figure.)

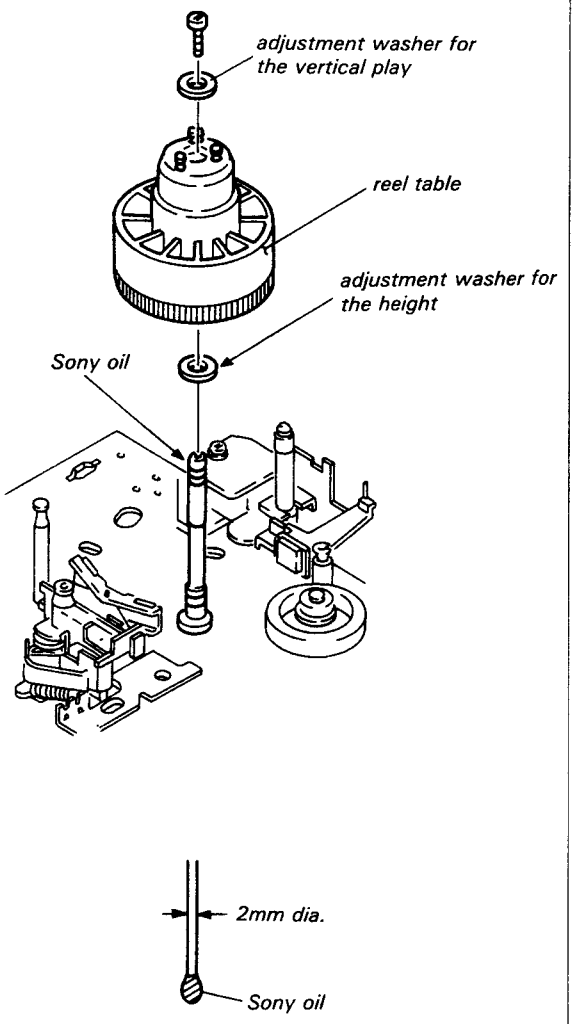
. Adjustment poly-slider washer:

3-645-567-11	6 mm dia.	0.05 mm thick
3-701-444-01	6 mm dia.	0.13 mm thick
3-701-444-11	6 mm dia.	0.25 mm thick
3-701-444-21	6 mm dia.	0.5 mm thick





Spec.: vertical play 0.17 mm ~ 0.38 mm


adjustment washer for the vertical play
reel table
adjustment washer for the height
Sony oil
2mm dia.
Sony oil

5-2. T DRAWER ARM ADJUSTMENT

5-2-1. T Drawer Arm EJECT Position Adjustment

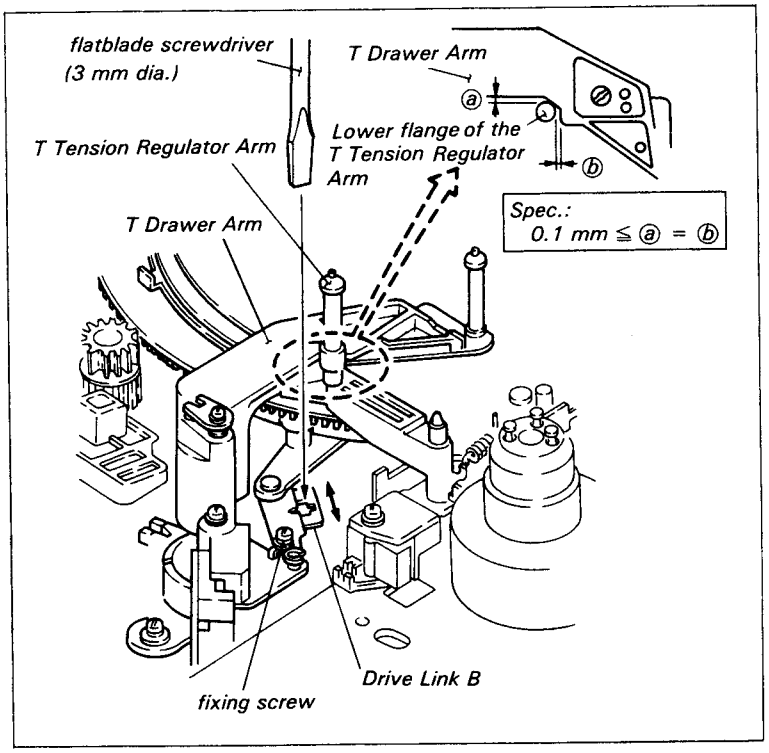
Mode: Put the unit into the FR-STOP mode without a cassette tape. And then put the unit inot the EJECT completion mode.

Check procedure:

(1) Check that the clearance between the lower flange of the T Tension Regulator Arm and the T Drawer Arm meets the required specification.

Adjustment procedure:

(1) Adjust the position of the Drive Link (B) Ass'y with a flatblade screwdriver (3mm dia.) to meets the required specification.



5-2-2. Unthread-end Switch Position Adjustment

Tool: Black vinyl tape
(1 cm x 1.5 cm)

Preparation:

(1) Put the unit into the FR-STOP mode and turn the power OFF.

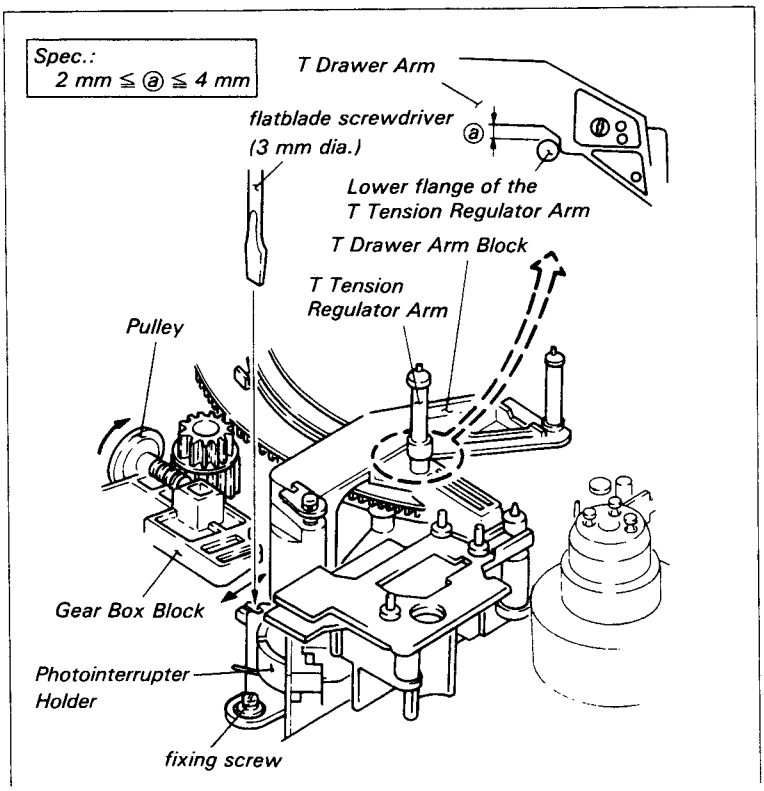
(2) Remove the Pinch Press Lever Spring from the bracket of the FR Detector Block with tweezers.

(3) Remove the FR Detector Block and cover the D2 photointerrupter (FR-UNTHREAD END Detector) with the black vinyl tape. (The FR Detector is put into the FR-STOP mode.)

Check procedure:

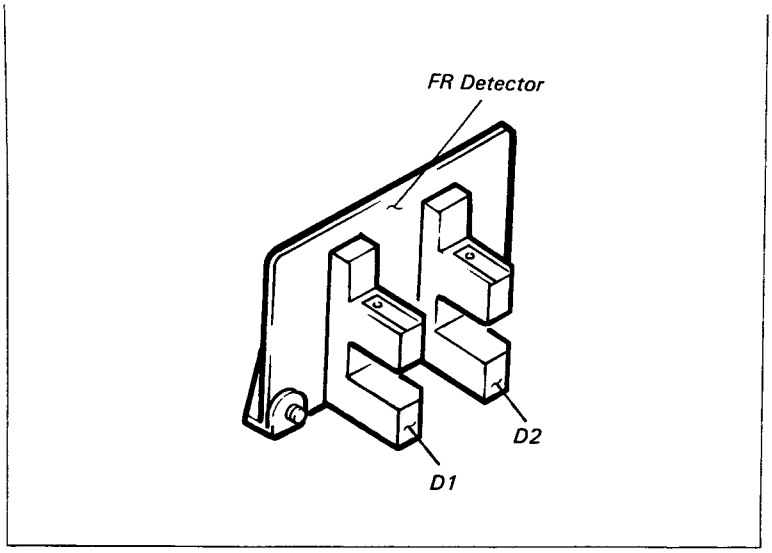
(1) Turn the power ON and rotate the pulley of Gear Box Block in the clockwise direction by hand.

(2) When the relationship of the T Drawer Arm and the T Tension Regulator Arm is as shown in the figure, check that the T Solenoid clicks.



Adjustment procedure:

(1) Adjust the position of the Photointerrupter Holder with a flatblade screwdriver (3mm dia.) to meet the required specification.
(2) Turn the power OFF and install FR Detector Block after peeling off the black vinyl tape.
(3) Perform Section 5-3-4, FR Detector Installing Position Adjustment.
(4) Hook the Pinch Press Lever Spring to the bracket of the FR Detector Block with tweezers.



5-3. THREADING SYSTEM ADJUSTMENT

5-3-1. Threading Ring Rotation Adjustment

. This adjustment is required only when the Threading Ring is replaced or removed.
. If the Threading Ring is adjusted to have a narrower clearance, the ring rotation becomes sluggish. If adjusted to have a wider clearance, tape run during threading, FWD, and REV modes will be unstable.

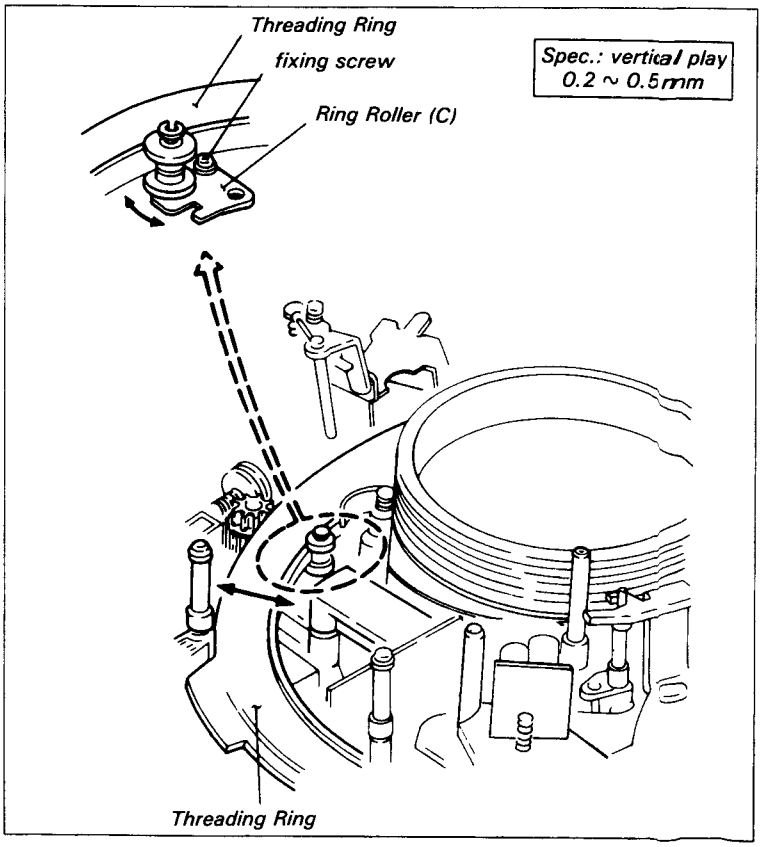
Mode: Check mode: EJECT completion/
Threading/Unthreading
Adjustment mode: EJECT completion

Check procedure:

(1) Put the unit into the EJECT completion mode. Check that the horizontal play meets the required specification when the Thteading Ring is pushed in the direction of the arrow.
(2) Check that the rotation of the Threading Ring during the Threading and Unthreading modes is smooth.

Adjustment procedure:

(1) Put the unit into the EJECT completion mode.
(2) Adjust the position of the Ring Roller (C) to meet the required specification.
Reference:
. Insert a 0.3 mm thick piece of paper between the Threading Ring and the Ring Roller (C).
. Three pages of this service manual are 0.3 mm thick.



5-3-2. Gear Box Installing Position Adjustment

. It is required that Section 5-3-1, Threading Ring Rotation Adjustment is correct before initiating this adjustment.

Mode: Put the unit into the EJECT completion mode. Turn the pulley of the Gear Box 1/2 to 1 turn in the direction of arrow C.

Check procedure:

(1) Put the unit into the EJECT completion mode and then turn the pulley of the Gear Box 1/2 to 1 turn in the direction of arrow C.

(2) Mark two lines on the top surface of the gear with a black felt tip pen. (Two lines are easy to see during the adjustment.)

(3) Turn the pulley in the direction of arrow C or D until one of the lines is roughly parallel to the outer circumference of the Threading Ring.

(4) Check that the relationship between the outer circumference of the Threading Ring and the Gear meets the required specification.

Adjustment procedure:

(1) Open the SY-106 Board.

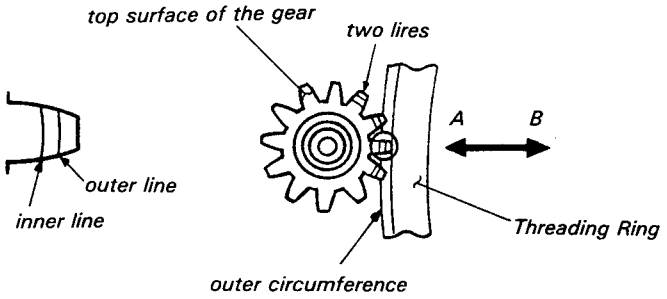
(2) Turn the pulley in the direction of arrow C or D until one of the lines is roughly parallel to the outer circumference of the Threading Ring.

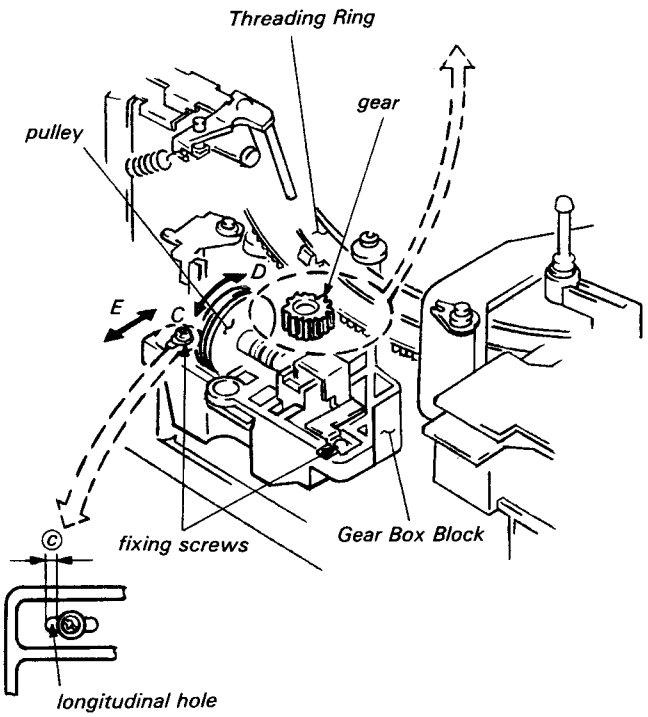
(3) Move the Gear Box in the direction of arrow E to meet the required specification.

(4) Check that Section 6-5-1, Threading Ring Rotation Adjustment meets the required specification.

(5) Check that © meets the required specification at the longitudinal hole of the gear block as shown in the figure.

Spec.:
(1) When pushing the Threading Ring in the direction of arrow A or B, the outer circumference of the Threading Ring is between two lines of the gear.





Spec.:
0.1 mm ≦ © ≦ 1.5 mm

5-3-3. Pinch Roller Self Alignment Adjustment

. If this adjustment is incorrect, the position and the slantness of the Pinch Roller will not be correct when the Pinch Roller is pressed against the Capstan Shaft. Incorrect adjustment will cause a tape to be damaged.

Mode: PLAY mode without a cassette tape

Check procedure:

(1) Put the unit into the PLAY mode without a cassette tape.

(2) Check that the relationship of Pinch Roller Arm (A) and Pinch Roller Arm (B) meets the required specification.

Adjustment procedure:

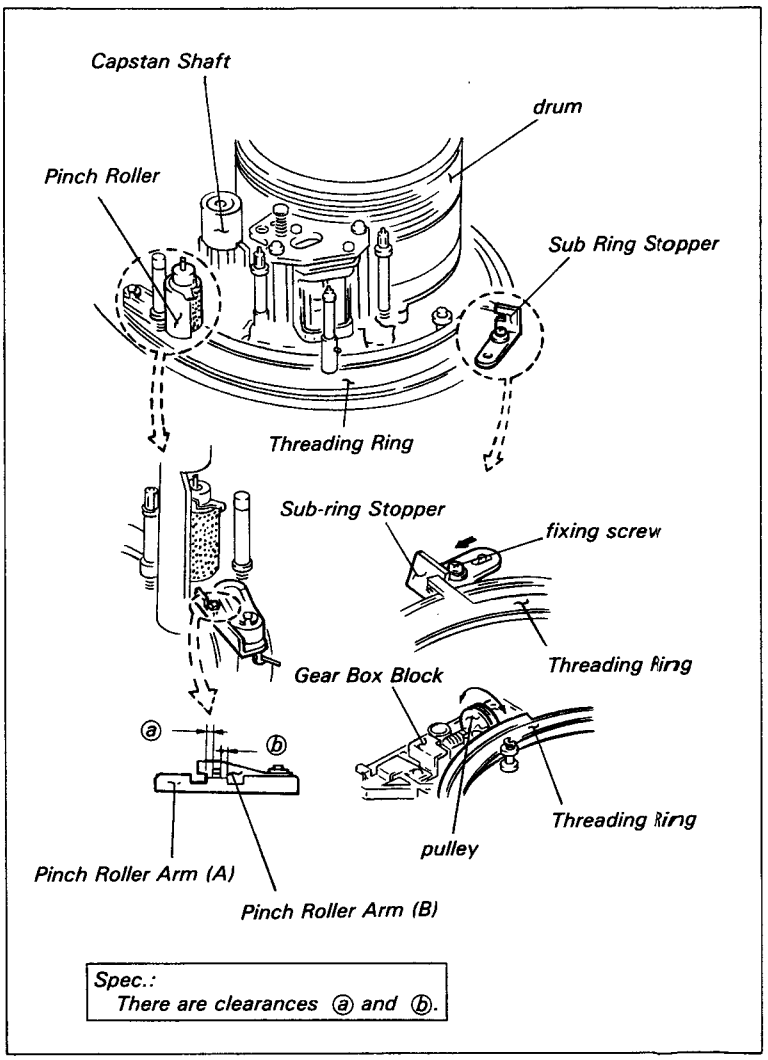
(1) Put the unit into the PLAY mode without a cassette tape.

(2) Loosen the fixing screw in the Sub-ring Stopper.

(3) Turn the pulley of the Gear Box Block in the direction of the arrow to meet the required specification.

(4) Push the Sub-ring Stopper gently in the direction of the arrow and tighten the fixing screw.

(5) Put the unit into the EJECT completion mode and then perfomn the check procedure.



5-3-4. FR Detector Block Installing Position Adjustment

. It is required that the Section 5-3-1, Threading Ring Rotation Adjustment is correct before initiating this adjustment.

Mode: Threading completion mode

Adjustment procedure:

(1) Put the unit into the Threading completion mode and turn the power OFF.

(2) Remove the Pinch Press Lever Spring from the bracket of the FR Detector Block with tweezers.

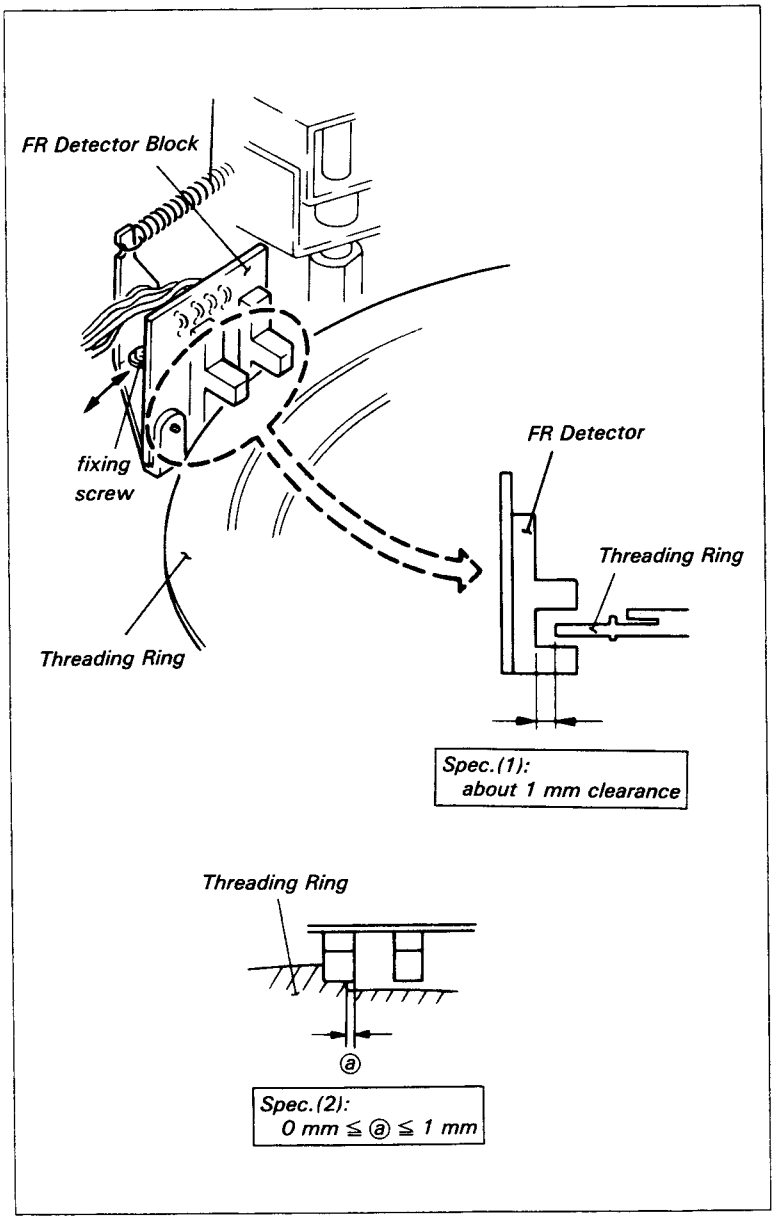
(3) Loosen the fixing screw of the FR Detector block 1/4 to 1/2 turn.

(4) Press the FR Detector Block against the Threading Ring, and reverse it about 1mm. (Do not reverse it more than 1.5mm) (Spec.1)

(5) Move the FR Detector Block in the direction of the arrow to meet the required specification 2.

(6) Check that the clearance meets the required specification 1.

(7) Hook the Pinch Press Lever Spring to the bracket of the FR Detector Block with tweezers.



5-4. PINCH LEVER BLOCK ADJUSTMENT

5-4-1. Pinch Lever Preset Adjustment

. It is required that Section 5-3-1, Threading Ring Rotation Adjustment and Section 6-3-3, Pinch Roller Self Alignment Adjustment are correct before initiating this adjustment.

Mode: Turn the power OFF in the PLAY mode

Check procedure:

(1) Put the unit into the PLAY mode and turn the power OFF. Check that the position of the Pinch Solenoid Pin meets the required specification.

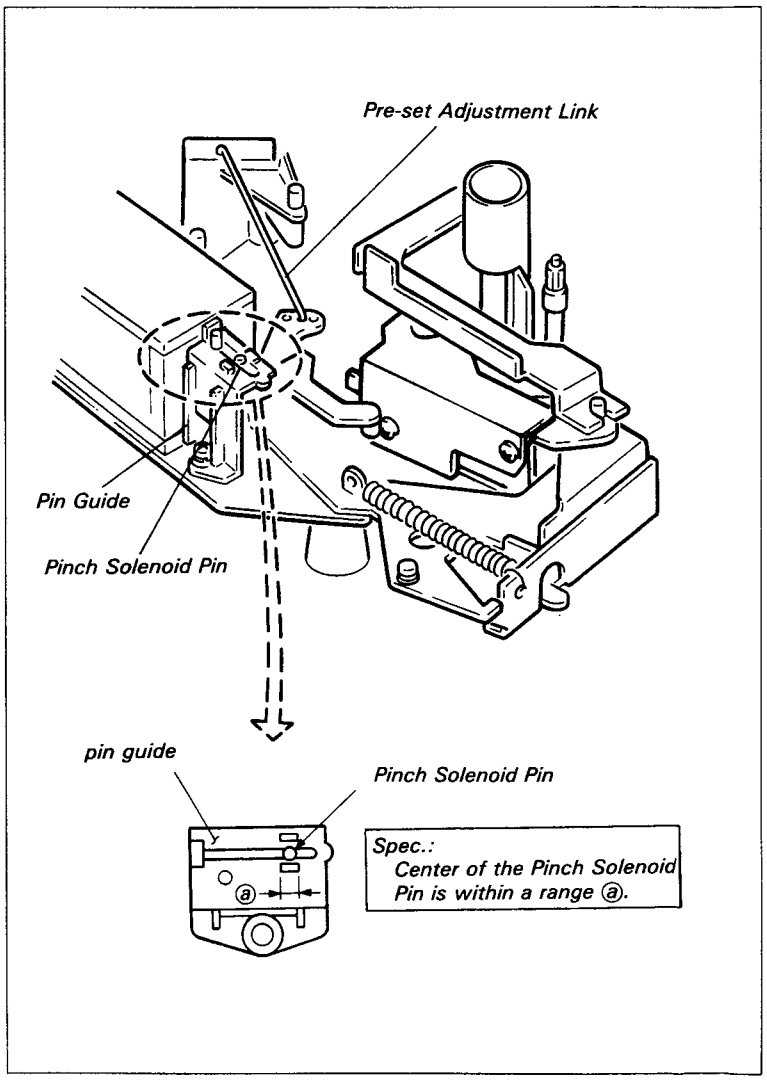
(2) Turn the power ON and press the PLAY button. After unthreading is complete, check as described in step (1).

Adjustment procedure:

(1) Adjust the position of the Pinch Solenoid to meet the required specification, refering to Section 5-7-4, Pinch Solenoid Installing Position Adjustment.

(2) If the specification in Step (1) cannot be obtained, adjust the position of the Sub-ring Stopper to meet the required specification, refering to Section 5-3-3, Pinch Roller Self Alignment Adjustment.

(3) If the specification in Steps (1) and (2) cannot be obtained, insert the Pinch Lever Preset Adjustment Link into the appropriate hole of the Preset Lever Ass'y to meet the required specification. Perform Steps (1) and (2) again.



5-4-2. Pinch Roller Preset Adjustment

It is required that Section 5-3-1, Threading Ring Rotation Adjustment and Section 5-3-3, Pinch Roller Self Alignment Adjustment are correct before initiating this adjustment.

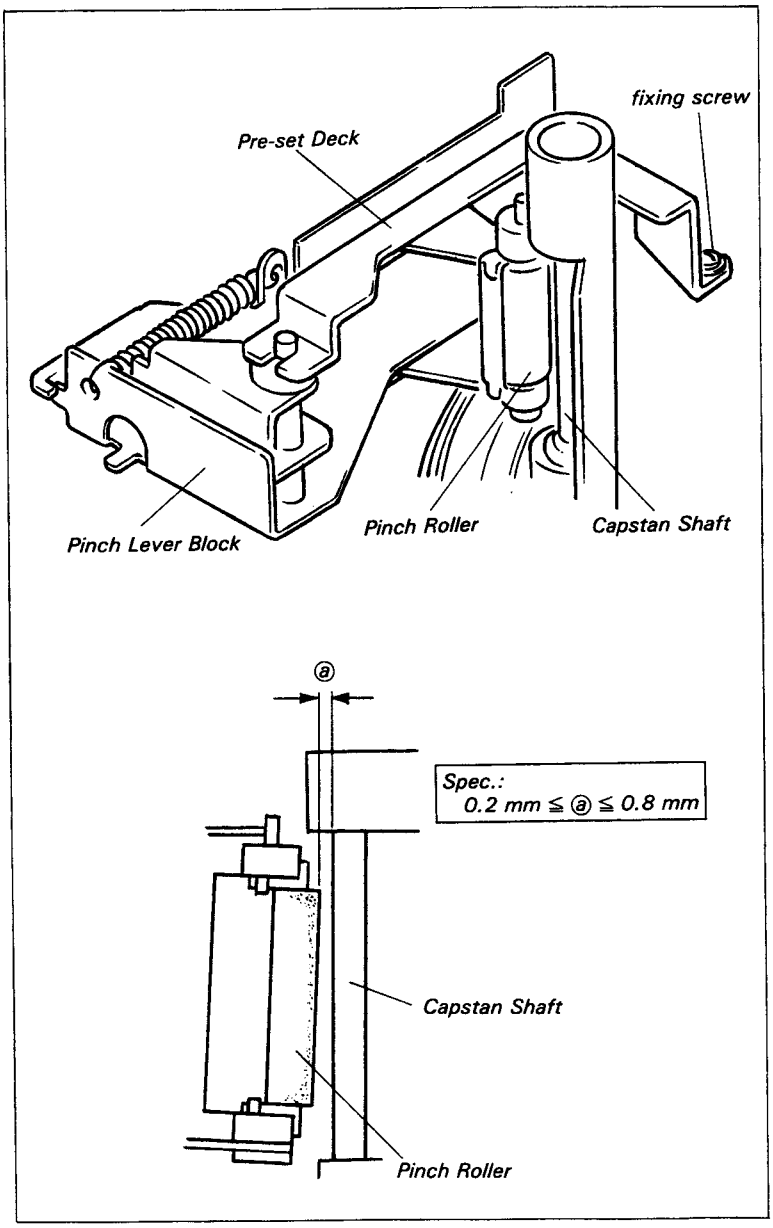
Tool: Thickness gauge
Mode: PLAY mode
Check procedure:

(1) Check that the clearance between the Pinch Roller and Capstan Shaft meets the required specification.

Adjustment procedure:

(1) Adjust the position of the Pre-set Deck to meet the required specification.

(2) Repeat the Threadihg/Unthreading modes two or three times and check that it meet the required specification.



5-4-3. Pinch Solenoid Block Position Adjustment

Tool: Thickness gauge

Mode: PLAY mode with a cassette tape

Check procedure:

(1) Insert a cassette tape and put the unit into the PLAY mode.

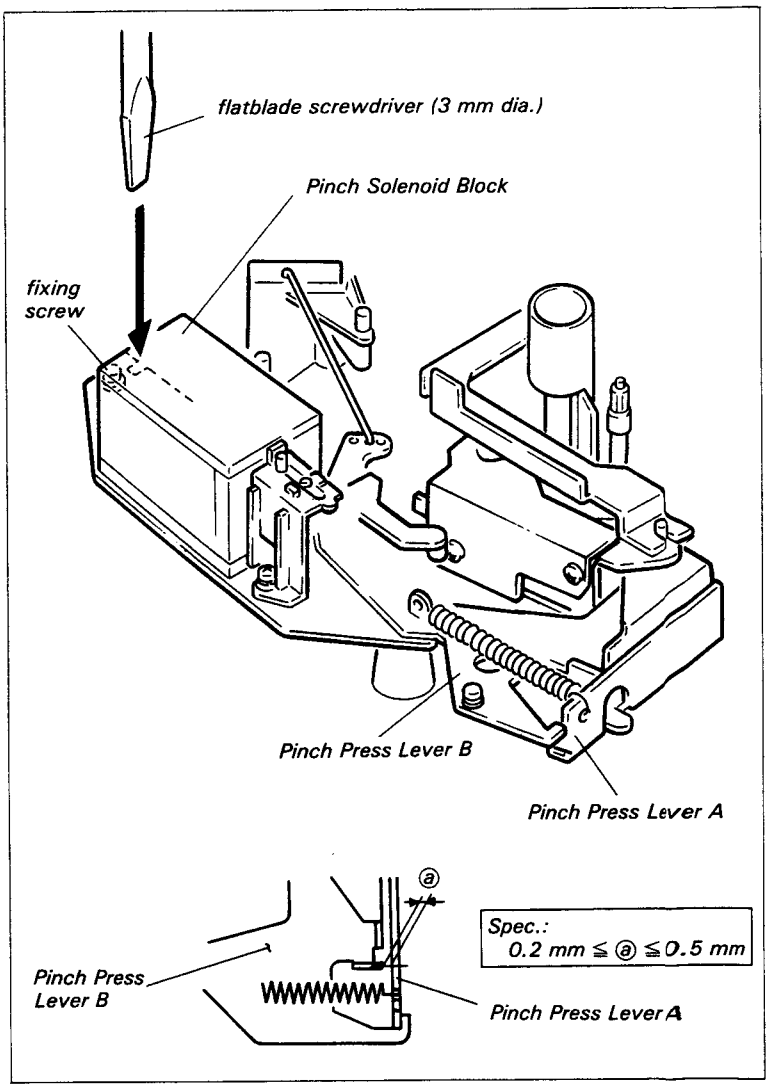
(2) Check that the clearance between Pinch Press Lever A and B meets the required specification.

(3) Repeat the Unthreading/Threading modes two or three times and check as described in step (2).

Adjustment procedure:

(1) Put the unit into the PLAY mode. Adjust the position of the Pinch Solenoid Block with a flatblade screwdriver (3 mm dia.) to meet the required specification.

(2) Perfom the check procedures (2) and (3).



5-5. T TAPE SENSOR POSITION ADJUSTMENT

. There are two adjustments in this section. The first is the height adjustment and the second is the adjustment of the clearance between the tape and LED.

Tool: Thickness gauge

Mode: PLAY and FR STOP modes with a cassette tape

Check procedure:

(1) Inset the cassette tape and put the unit into the FR STOP mode. Push the tape by hand as shown in the figure. Check that the clearance between top edge of the tape and bottom side of the T Photo Holder Block (black plastic) meets the required specification. (Spec. (1))

(2) Put the unit into the PLAY mode.

(3) As viewed from the top of the unit, check that the ※※ of the T Tape Sensor Block is above the upper flange of the T Drawer Arm (within the range "A"). (Spec. (2))

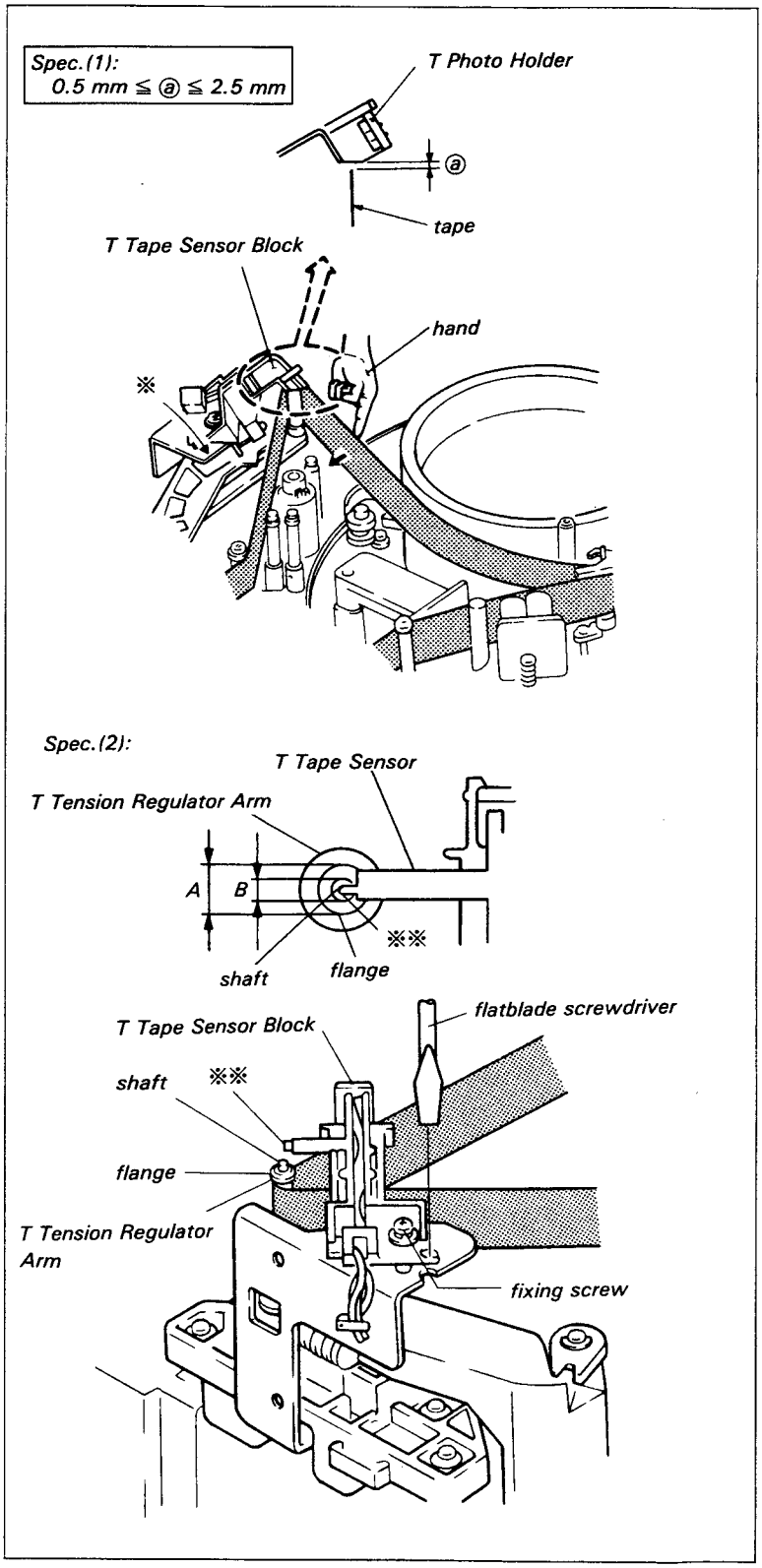
Adjustment procedure:

(1) Bend the ※ with a pliers to meet the required specification (1). Perfom check procedures (2) and (3).

(2) Loosen the fixing screw of the T Tape Sensor Block 1/2 to 1 turn.

(3) As viewed from the top of the unit in the PLAY mode, adjust the position of the T Tape Sensor Block with a flatblade screwdriver so that the ※ ※ of the T Tape Sensor Block is above the shaft of the T Drawer Arm (within the range "B").

(4) Check that it meets the required specification (1).



5-6. TENSION ARM SYSTEM ADJUSTMENT

5-6-1. S Drawer Roller Block Limiter Adjustment

Mode: FR-STOP mode

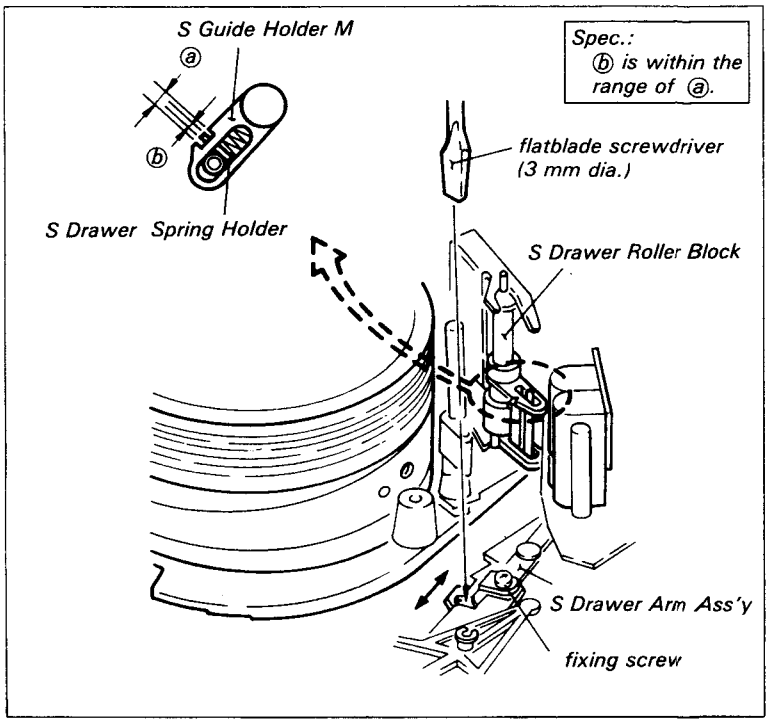
Check procedure:

(1) Check that " b " of the S Drawer Spring Holder in the S Drawer Roller Block fits into notch " a " of the S Guide Holder M.

Adjustment procedure:

(1) Loosen the fixing screw of the S Drawer Arm Ass'y 1/4 to 1/2 turn.

(2) Adjust the position of the S Drawer Arm Ass'y with a flatblade screwdriver (3 mm dia.) to meet the required specification.



5-6-2. T Tension Regulator Operatiing Position Adjustment

Mode: FR-STOP mode

Tool: Thickness gauge

Check procedure:

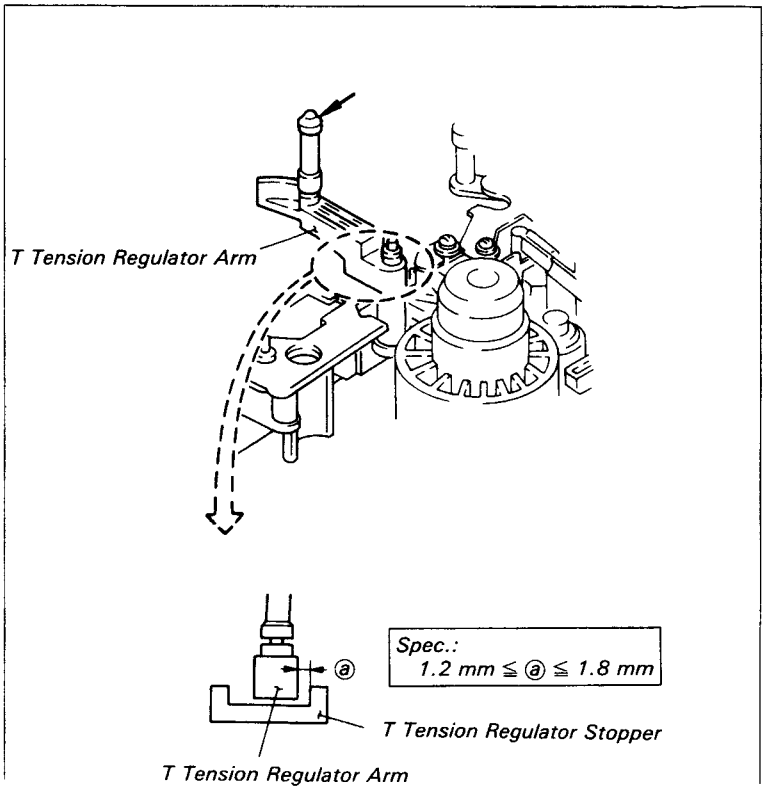
(1) Push the T Tension Regulator Arm in the direction of the arrow and remove the finger gently.

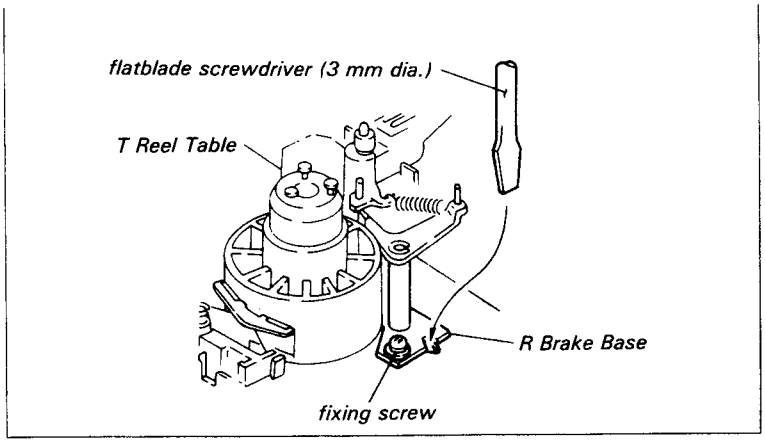
(2) Check that the clearance between the T Tension Regulator Arm and the stopper meets the required specification.

Adjustment procedure:

(1) Loosen the fixing screw of the R Brake Base 1/4 to 1/2 turn.

(2) Adjust the position of the R Brake Base with a flatblade screwdriver (3mm dia.) to meet the required specification.





5-6-3. S Tension Regulator Operating Position Adjustment

Mode: FF mode

Check procedure:

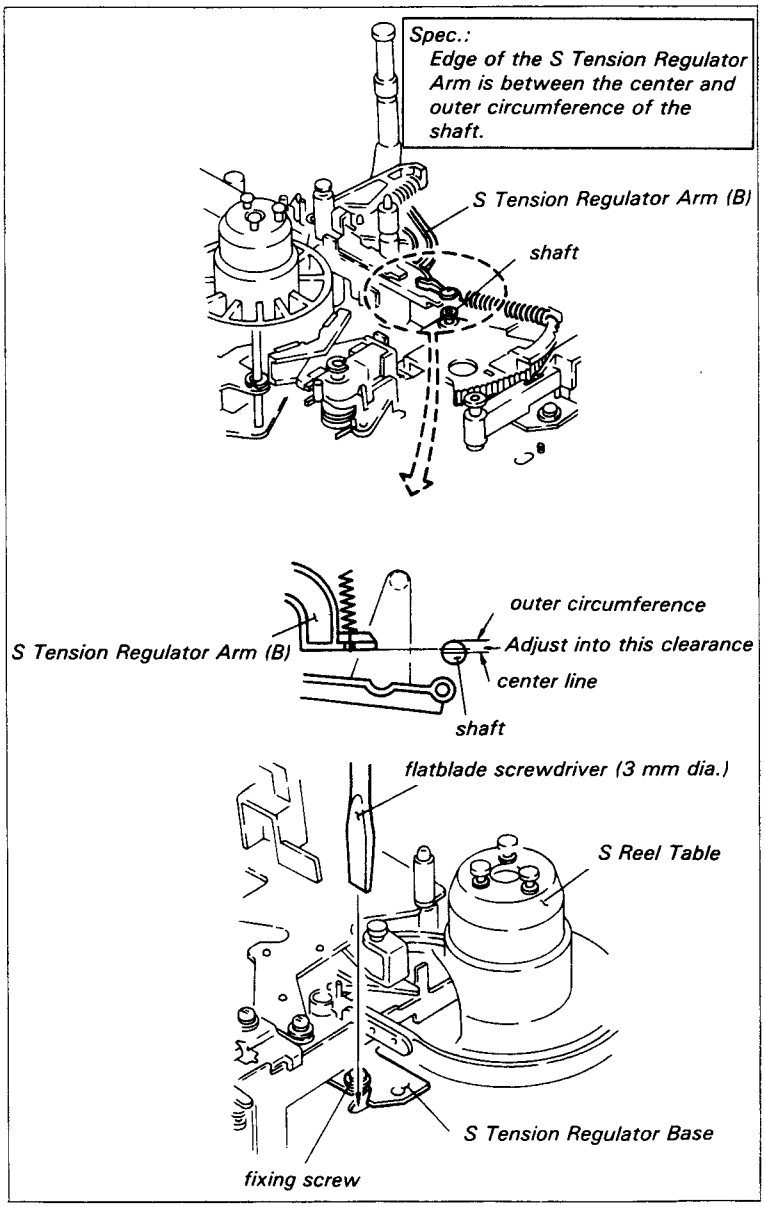
(1) Put the unit into the FF mode without a cassette tape.

(2) Check that the edge of the S Tension Regulator Arm (B) meets the required specification.

Adjustment procedure:

(1) Loosen the fixing screw of the S Tension Regurator Base 1/4 to 1/2 turn.

(2) Adjust the position of the S Tension Regulator Base to meet the required specification.


Spec.:
Edge of the S Tension Regulator Arm is between the center and outer circumference of the shaft.
S Tension Regulator Arm (B)
shaft
outer circumference
Adjust into this clearance
center line
S Tension Regulator Arm (B)
shaft
flatblade screwdriver (3 mm dia.)
S Reel Table
S Tension Regulator Base
fixing screw

5-6-4. Tension Detector Position Adjustment

Tool: DC voltmeter

Mode: FWD / REV mode

Preparation:

(1) Connect the dc voltmeter to TP1 on the SY-106 Board.

Check procedure:

(1) Put the unit into the FWD mode without a cassette tape.

(2) Push the T Tension Regulator Arm to the right with a hand as far as it will go. Check that the dc voltage is more than 8V.

(3) Push the T Tension Regulator Arm to the left with a hand as far as it will go. Check that the dc voltage is less than 2.5V.

(4) Put the unit inti the REV mode.

(5) Push the S Tension Regulator to the right with a hand as far as it will go. Check that the dc voltage is less than 2.5 V.

(6) Push the S Tension Regulator to the left with a hand as for as it will go. Check that the dc voltage is more than 8 V.

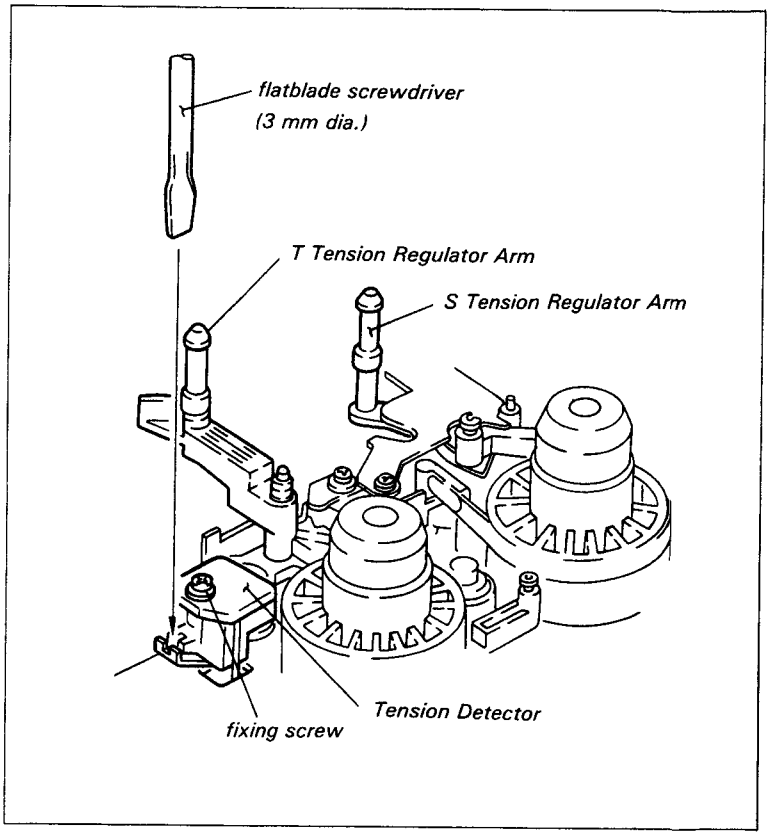
Adjustment procidure:

(1) Remove the FR Detector Block from the unit.

(2) Loosen the fixing screw of the Tension Dtetctor 1/4 to 1/2 turn.

(3) Insert a flatblade screwdriver (3 mm dia) in the notch and adjust the position of the Tension Detector to meet the required specification.

(4) After adjustment, install the FR Detector.



5-6-5. T Tension Regulator Arm Height Adjustment

Tool: L-shaped hexagonal wrench
(across flat has 1.5 mm)

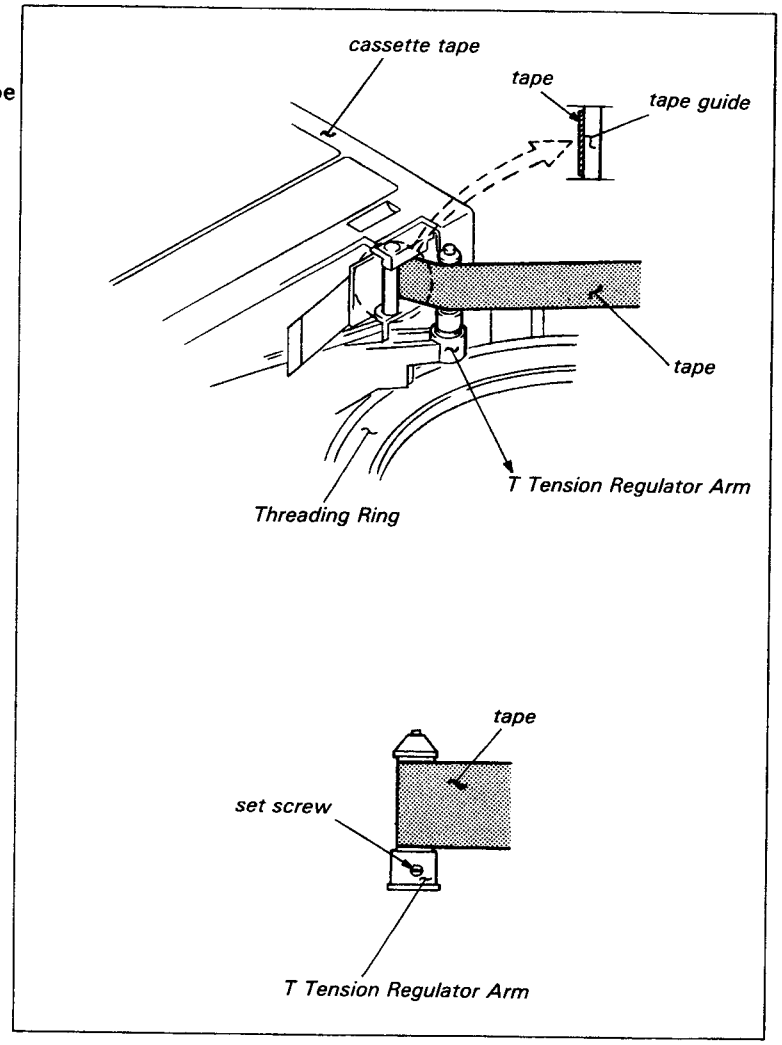
Mode: PLAY / F FWD mode with a cassette tape

Check procedure:

(1) Insert a cassette tape and put the unit into the PLAY mode.
(2) Check that the tape runs in the middle of the tape guide in the cassette.
(3) Check that the tape runs in the middle of the T Tension Detector Guide.
(4) Put the unit into the F FWD mode.
(5) Check as described in steps (2) and (3).

Adjustment procedure:

(1) Loosen the set screw at the lower flange of the T Tension Regulator Arm.
(2) Adjust the height of the T Tension Regulator Arm to meet the required specification.



5-7. SEARCH SOLENOID SYSTEM ADJUSTMENT

5-7-1. Search Solenoid Installing Position Adjustment

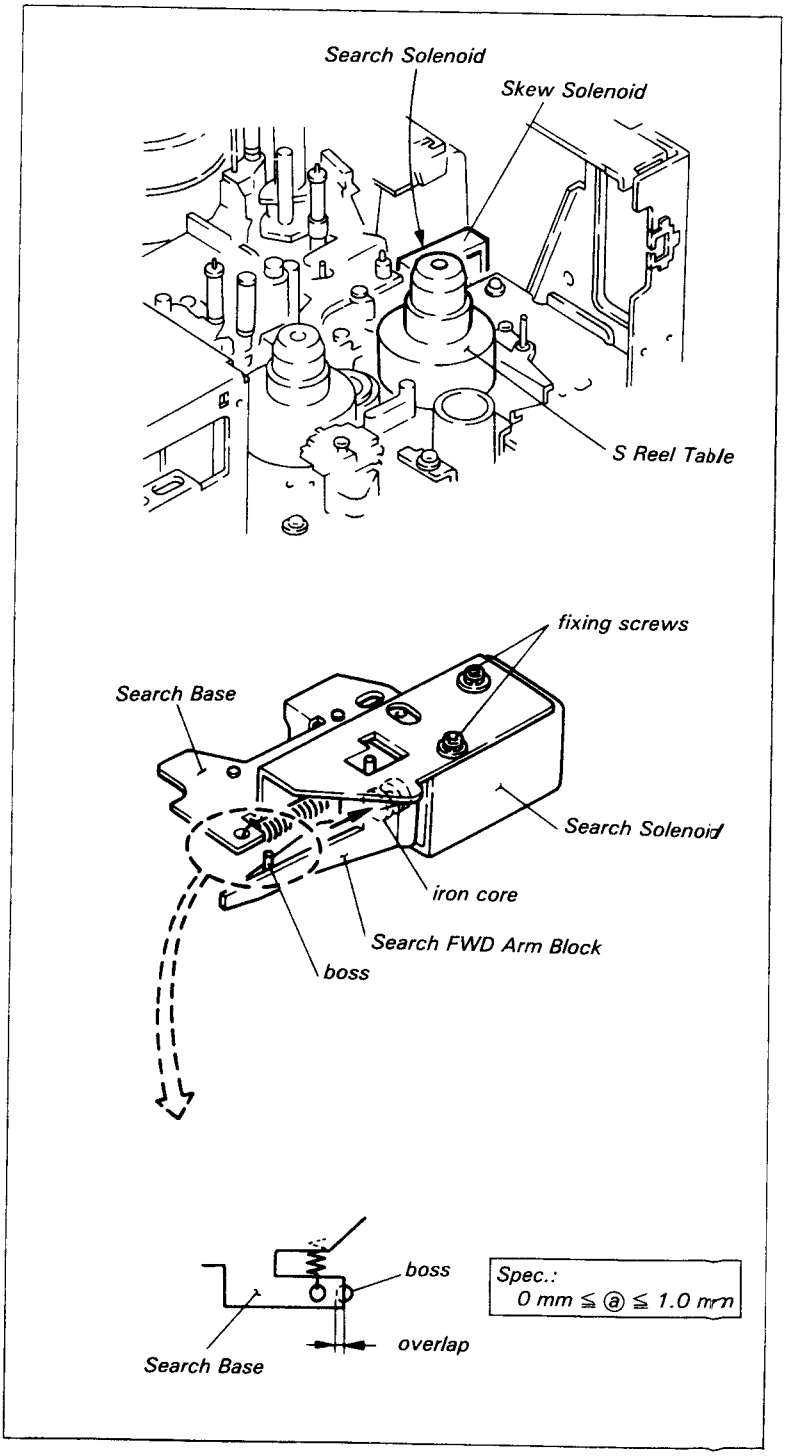
. This adjusment is required only when the search solenoid is replaced or removed.

Preparation:

(1) Remove the Search Solenoid Block from the chassis.

Adjustment procedure:

(1) Move the iron core into the fully energized position (as far as it will go in the direction of the arrow). Adjust the position of the Search Solenoid so that the overlap of the Search FWD Arm Boss and the Search Base meets the required specification.



5-7-2. T Idler Solenoid Position Adjustment

. This adjustment is performed when T Idler Solenoid is replaced or removed, and the F FWD Torque does not meet the required specification.

Mode: F.FWD mode without a cassette tape

Adjustment procedure:

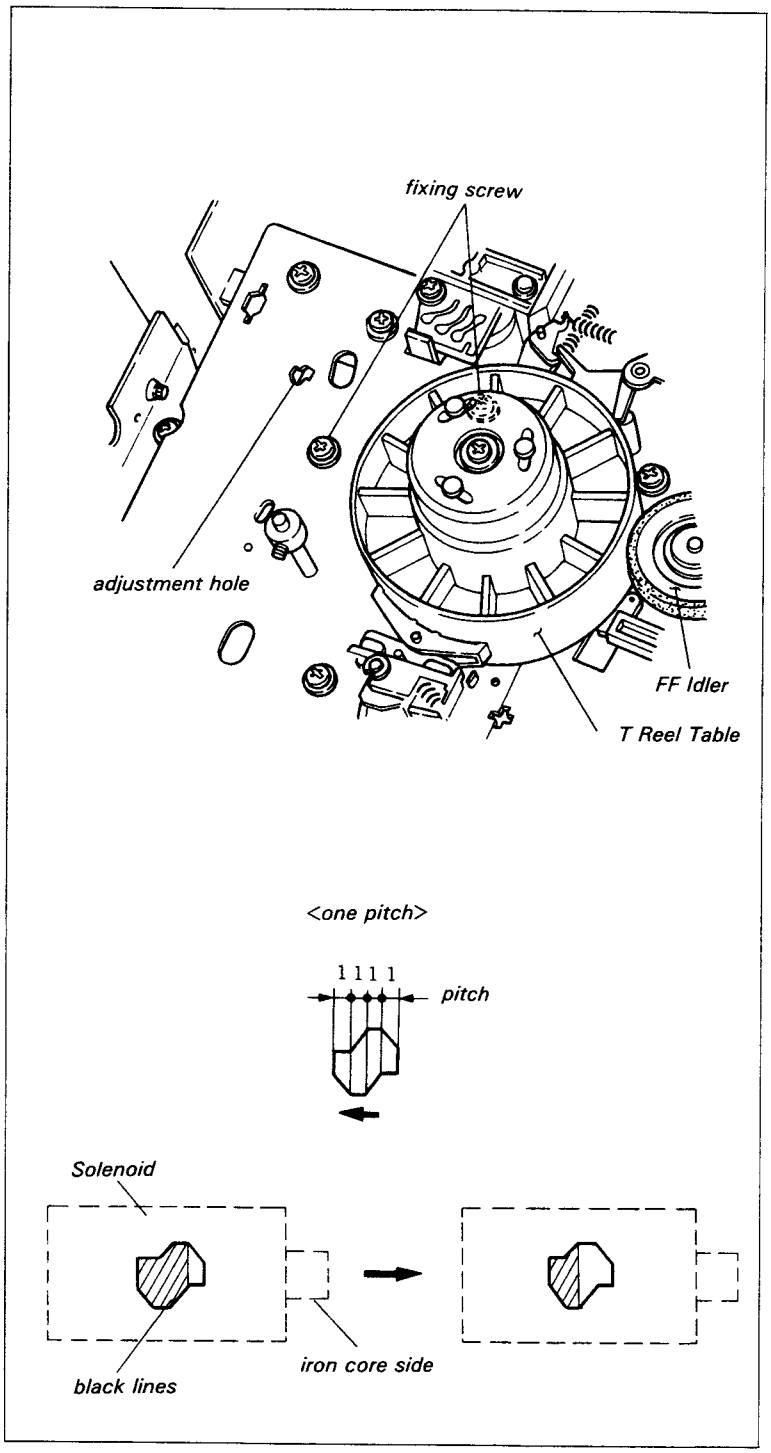
(1) Put the unit into the F FWD mode without a cassette tape.

(2) Loosen the fixing screws of the T Idler Solenoid about 1/2 turn.

(3) Adjust the position of the T Idler Solenoid until the clearance between the T Reel Table and FF Idler become 0.01 to 0.1 mm.

(4) Note the adjustment hole and check that the black line of the solenoid is in this hole.

(5) Move the Solenoid in the direction of the arrow only one pitch from the position of step (4). Tighten the fixing screws.



5-7-3. S Idler Solenoid Position Adjustment

. This adjustment is required only when the S Idler Solenoid is replaced or removed, and the REW Torque does not meet the required specification.

Mode: REW mode without a cassette tape

Adjustment procedure:

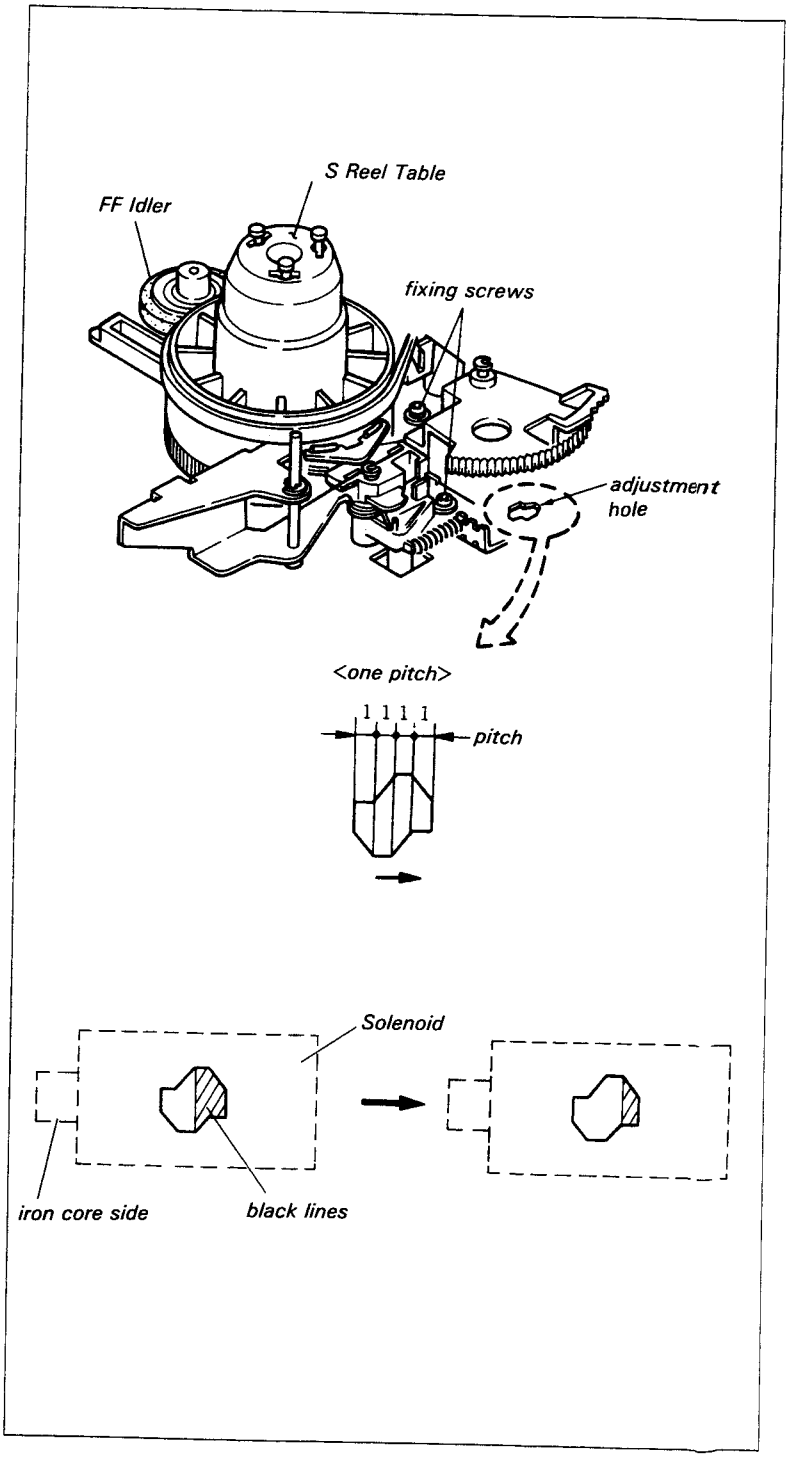
(1) Put the unit into the REW mode without a cassette tape.

(2) Loosen the fixing screws of the S Idler Solenoid about 1/2 turn.

(3) Adjust the position of the S Idler Solenoid until the clerance between the S Reel Table and FF Idler become 0.01 to 0.1 mm.

(4) Note the adjustment hole and check that the black line of the solenoid is in this hole.

(5) Move the Solenoid in the direction of the arrow only one pitch from the position of step (4). Tighten the fixing screws.



5-7-4. Pinch Solenoid Installing Position Adjustment

. This adjustment is required only when the Pinch Solenoid is replaced or removed.

Mode: PLAY mode with a cassette tape

Check procedure:

(1) Insert a cassette tape and put the unit into the PLAY mode.

(2) Check that the outer circumference of the Solenoid Pin meets the required specification.

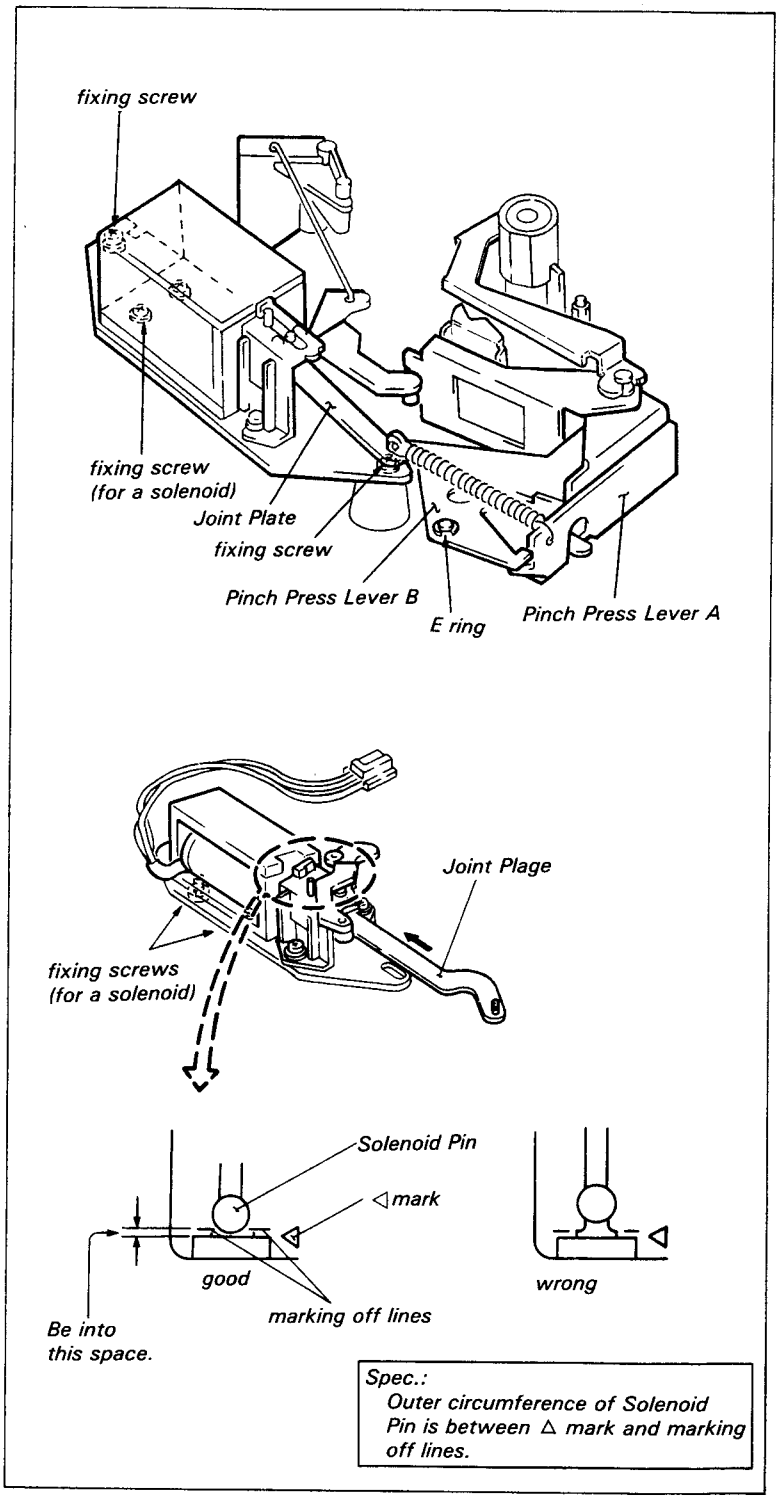
Adjustment procedure:

(1) Remove the E ring and the Joint Lever from the Pinch Press Lever B.

(2) Remove the Pinch Solenoid Block from the chassis after removing the two fixing screws.

(3) Move the Joint Lever to the fully energized position (as far as it will go in the direction of the arrow). Adjust the position of the solenoid so that the outer circumference of the Solenoid Pin to meet the required specification.

(4) Install the Pinch Solenoid Block on the unit. Perfom the check procedure.



5-7-5. T Brake Solenoid Position Adjustment

Tool: Eccentric screwdriver (6 ϕ)

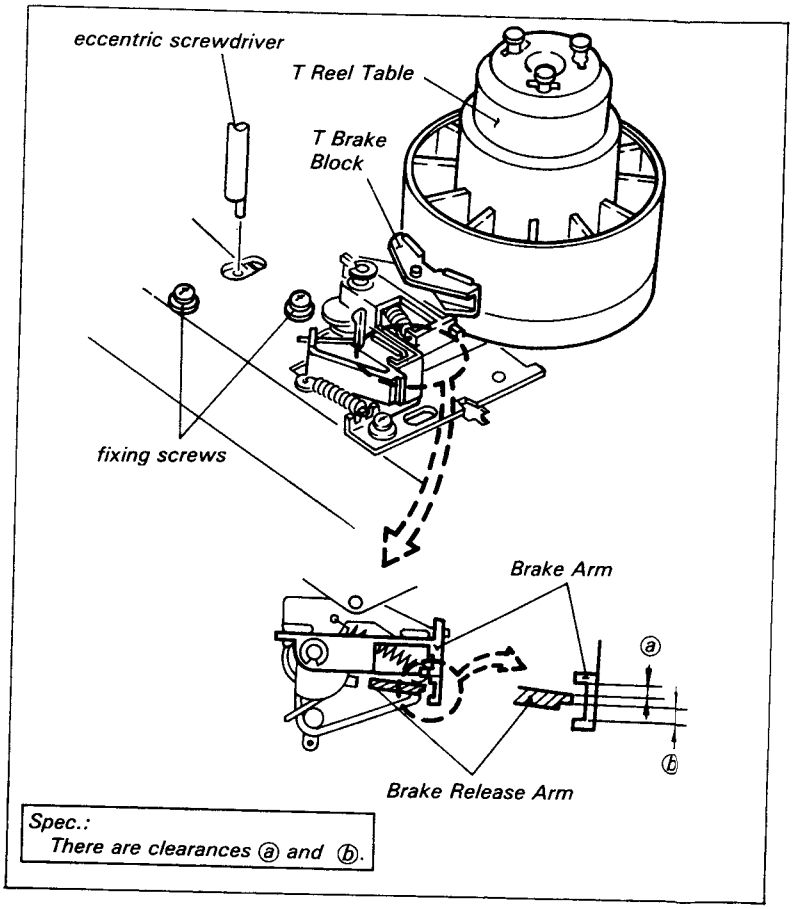
Mode: PLAY mode without a cassette tape

Check procedure:

(1) Check that the relationship between the Brake Release Arm and the Brake Arm meets the required specification.

Adjustment procedure:

(1) Adjust the position of the T Brake Solenoid with an eccentric screwdriver to meet the required specification.



5-7-6. S Brake Solenoid Position Adjustment

Tool: Eccentric screwdriver (6 ϕ)

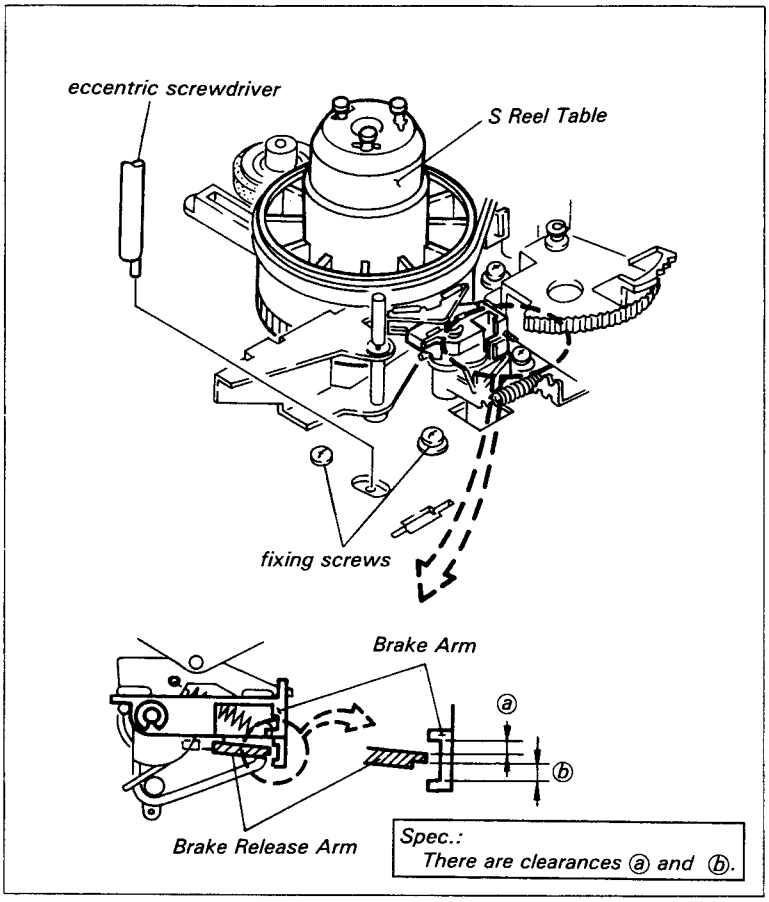
Mode: PLAY mode without a cassette tape

Check procedure:

(1) Check that the relationship between the Brake Release Arm and the Brake Arm meets the required specification.

Adjustment procedure:

(1) Adjust the position of the S Brake Solenoid with an eccentric screwdriver to meet the required specification.



5-7-7. Skew Solenoid Position Adjustment

Mode: EJECT completion mode

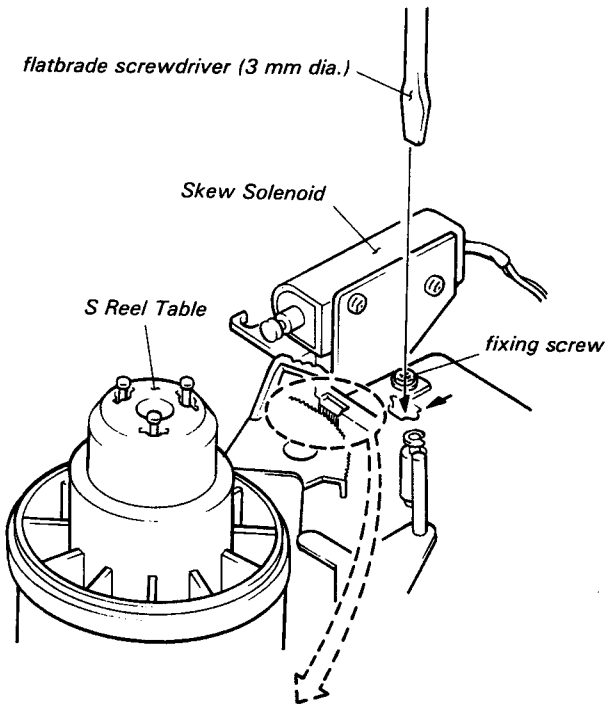
Check procedure:

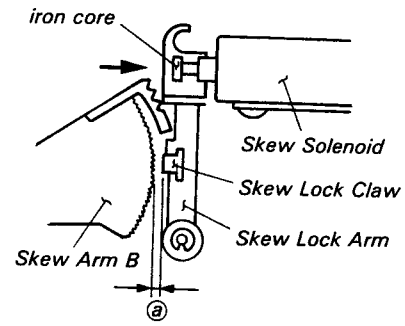
(1) When pushed the iron core in the direction of the arrow, check that the clearance between the Skew Lock claw and Skew Arm B meets the required specification.

Adjustment procedure:

(1) Loosen the fixing screw of the Skew Solenoid Block 1/4 to 1/2 turn.

(2) Adjust the position of the Skew Solenoid with a flatblade screwdriver (3 mm dia.) to meet the required specification.





Spec.:
0.2 mm ≦ ⓐ ≦ 0.5 mm

5-8. CASSETTE-UP COMPARTMENT ADJUSTMENT

. The Cassette-up Compartment has two photo-electric switches. The ON/OFF timing of these switches is adjusted in this procedures.
. Remove the Cassette-up Compartment from the unit for this adjustment.

5-8-1. Cassette-in Switch Position Adjustment

Tool: Circuit tester
Thickness gauge

Preparation:

(1) Connect jumpers from the harness plug for the Cassette-up Compartment to terminals on the CC-31 Board as follows:

plug of harness (CN1)	terminal on CC-31 Board
pin 4 (5V) ◄——►	pin 4/CN401
pin 5 or 2 (GND) ◄——►	pin 5 or 2/CN401

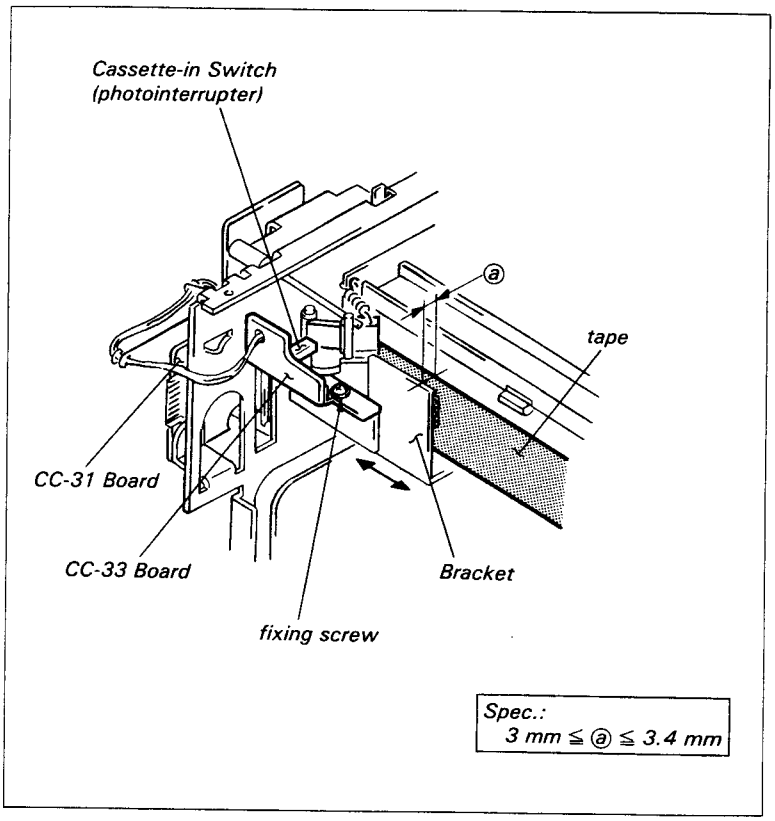
(2) Turn the power ON.

Check procedure:

(1) Connect the circuit tester to pin 1 (H; CASSETTE IN) of CN401 on the CC-31 Board.
(2) Slowly insert a KCA-60 type cassette tape.
(3) When the circuit tester indicates "H" (about 5V), check that the clearance between the front side of the cassette tape and the bracket of the Cassette- up Compartment meets the required specification.

Adjustment procedure:

(1) Move the Cassette-in Switch in the direction of the arrow to meet the required specification.
. Reference:
Insert a 3.3 mm thickness gauge between the cassette tape and the bracket. Adjust the position of the Cassette-in Switch until the circuit tester indicates to "H".



5-8-2. Cassette-down Switch Position Adjustment

Tool: Circuit tester

Preparation:

(1) Connect jumpers from the harness plug of the Cassette-up Compartment to terminal on the CC-31 Board as follows:

plug of harness (CN1)	terminal on CC-31 Board
pin 4 (5V) ◄——►	pin 4/CN401
pin 5 or 2 (GND) ◄——►	pin 5 of 2/CN401

(2) Turn the power ON.

Check procedure:

(1) Connect the circuit tester to pin 3 (H; CASSETTE DOWN) of CN401 on the CC-31 Board.

(2) Insert a KCA-60 type cassette tape and turn the white gear slowly in the direction of the arrow.

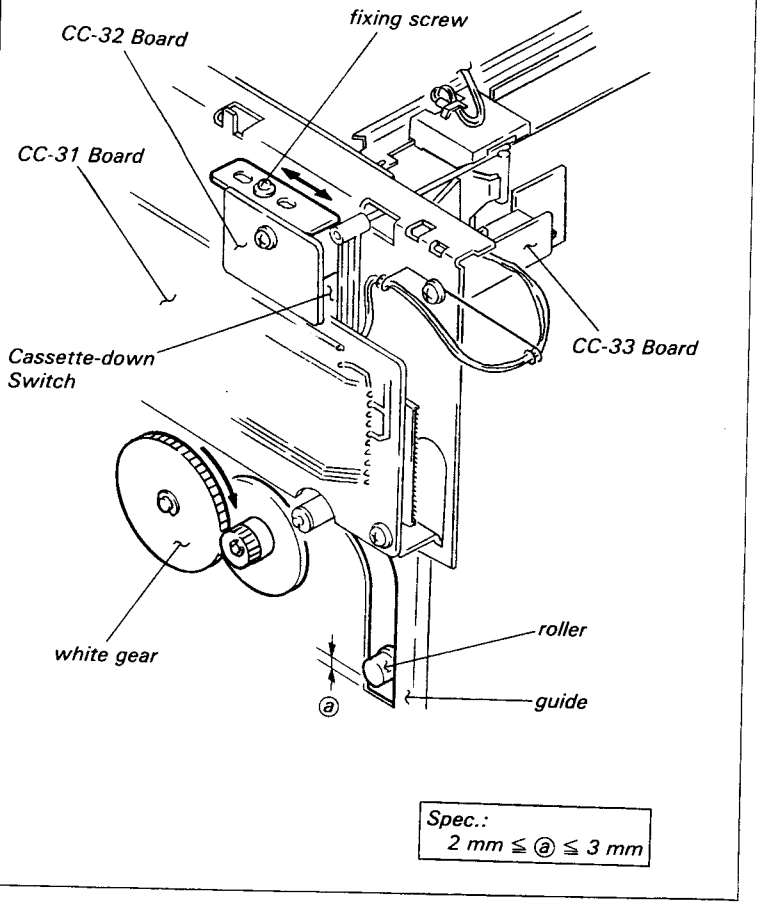
(3) When the circuit tester indicates "H", check that the clearance between the roller and the guide meets the required specification.

Adjustment procedure:

(1) Move the Cassette-down switch in the direction of the arrow to meet the required specification.

. Reference:

Turn the white gear on the right side until the clearance between the roller and the guide is 2.2 mm. Adjust the position of the Cassette-down Switch so that the circuit tester indicates "H" in this position.



5-9. LEAF SPRING POSITION ADJUSTMENT

Check procedure:

(1) Put the unit into the PLAY mode without a cassette tape and then put the unit into the EJECT mode.

(2) Turn the Gear Box Pulley by hand so that the edge of the T Drawer Arm is at the center of the shaft as shown in the figure.

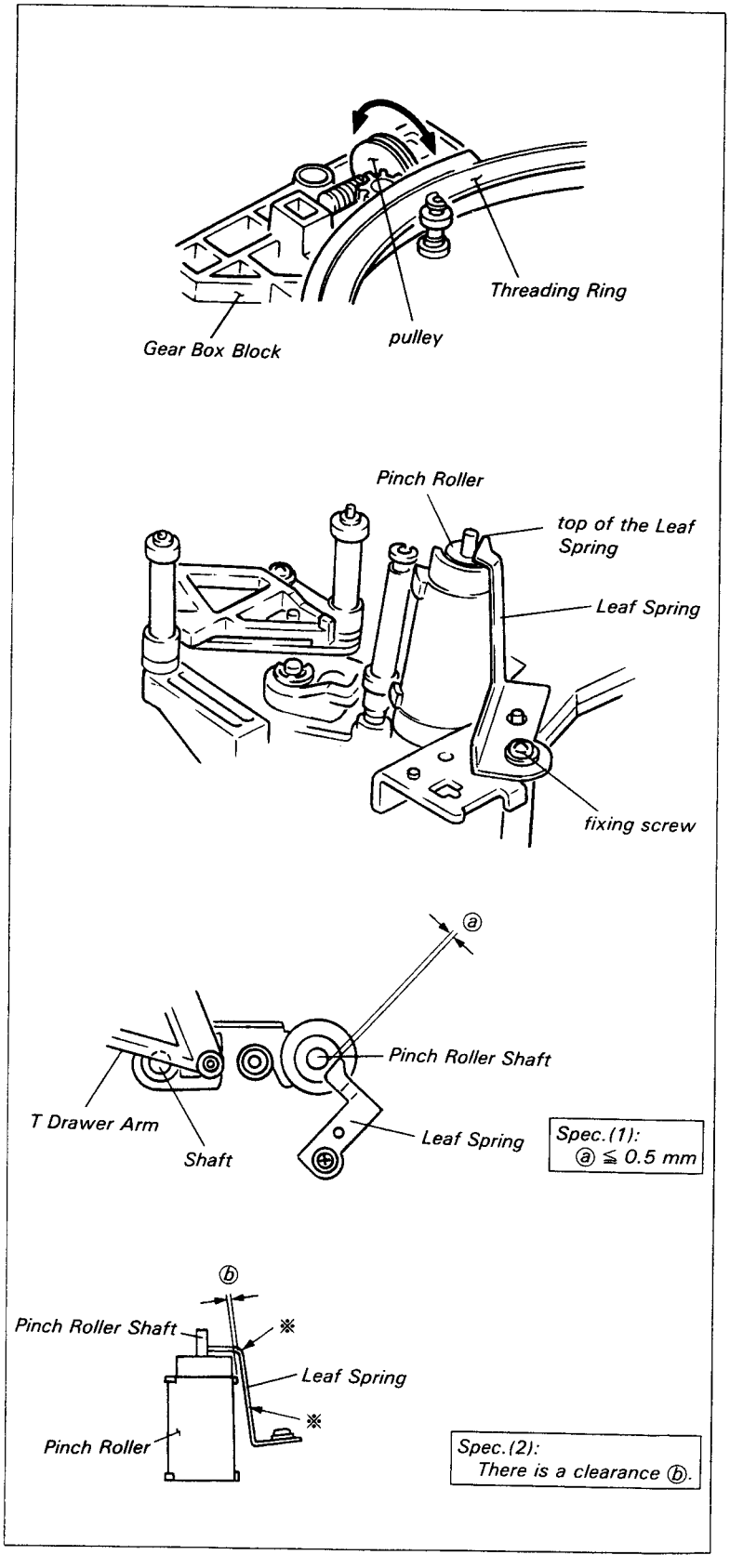
(3) Check that the clearance between the Leaf Spring and the Pinch Roller Shaft meets the required specificaiton (1).

(4) Put the unit into the PLAY mode without a cassette tpae and then put the unit into the EJECT completion mode.

(5) Check that the Leaf Spring touches the Pinch Roller Shaft, and the clearance between the Leaf Spring and the Pinch Roller meets the required specification (2).

Adjustment procedure:

(1) Adjust the position of the Leaf Spring to meet the required specifications (1) and (2). If only specification (2) cannot be obtained, bend the ※ of the Leaf Spring to meet the required specification.



SECTION 6
BACK TENSION AND TORQUE ALIGNMENT

6-1. BRAKE SYSTEM ADJUSTMENT

6-1-1. S Brake Torque Adjustment

Tool: Reel table torque measurement tape (100 mm dia.)
Tension scale (200 g full scale)

Mode: EJECT completion / power OFF mode

Check procedure:

(1) Grasp the top of the S Reel Table. While turning it in the clockwise direction approx. 30 degrees, check that the clearance between the Brake Arm and the Lining Holder meets the required specification (1).

(2) Place the jig tape on the S Reel Table and hook a tension scale to the end of the jig tape. Pull out the tape at a constant speed of approx. 9.5cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification (2).

Adjustment procedure:

For Spec. (1)

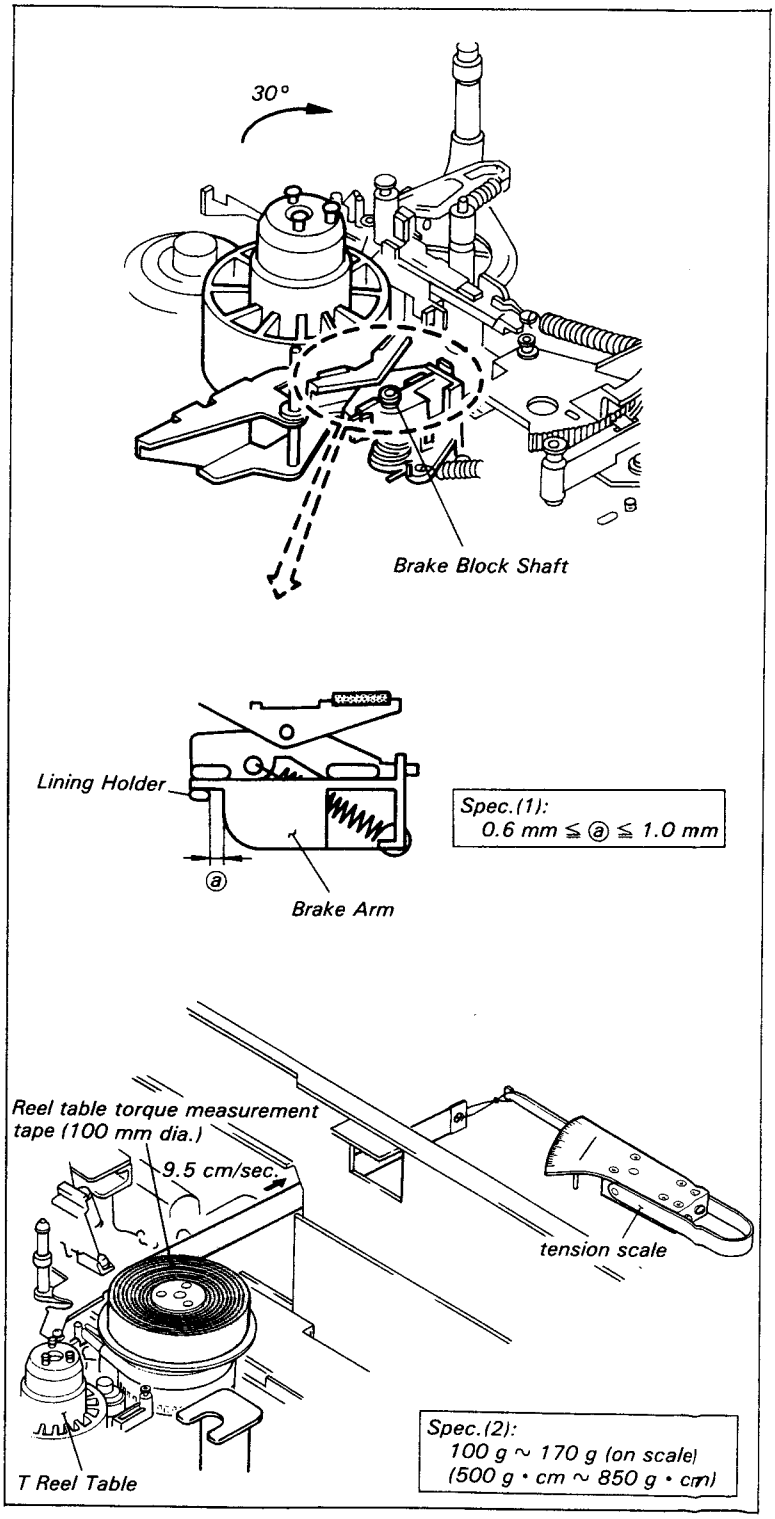
(1) Bend the Brake Block Shaft toward the reel table (or in the opposite direction) by hand.

For Spec. (2)

(2) Clean the surface of the reel table with a cloth moistened with cleaning fluid.

(3) If does not meet the specification (2), replace the Lining Holder and check again.

(4) If does not meet the specification in Step (3), replace the reel table and check again.



6-1-2. T Brake Torque Adjustment

Tool: Reel table torque measurement tape (100 mm dia.)
Tension scale (200 g full scale)

Mode: EJECT completion / power OFF mode

Check procedure:

(1) Grasp the top of the T Reel Table. While turning it in the clockwise direction approx. 30 degrees, check that the clearance between the Brake Arm and the Lining Holder meets the required specification (1).

(2) Place the jig tape on the T Reel Table and hook a tension scale to the end of the jig tape. While pushing the T Tension Regulator to the left, pull out the tape at a constant speed of approx. 9.5cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification (2).

Adjustment procedure:

For Spec. (1)

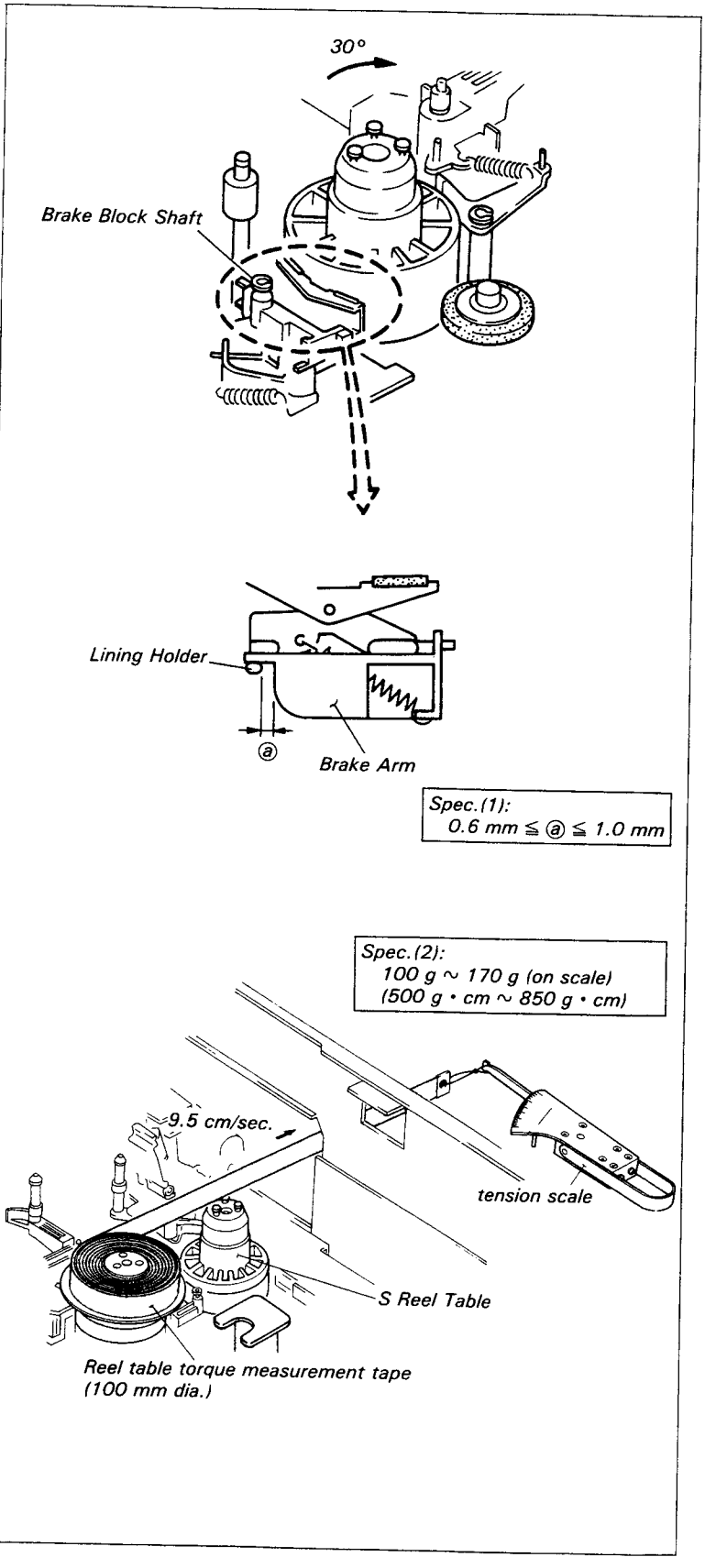
(1) Bend the Brake Block Shaft toward the reel table (or in the opposite direction) by hand.

For Spec. (2)

(2) Clean the surface of the reel table with a cloth moistened with cleaning fluid.

(3) If does not meet the specification (2), replace the Lining Holder and check again.

(4) If does not meet the specification in Step (3), replace the reel table and check again.



6-1-3. REW Brake Torque Adjustment

Mode: REW mode

Tool: Reel table torque measurement tape (100 mm dia.)
Tension scale (50 g full scale)

Check procedure:

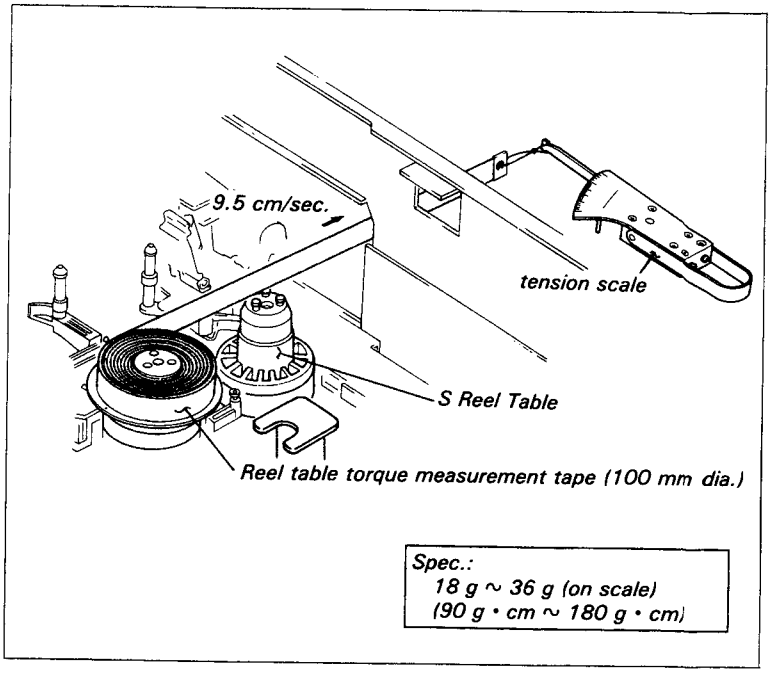
(1) Place the jig tape on the T Reel Table and hook a tension scale to the end of the jig tape.

(2) Put the unit into the REW mode. Pull out the tape at a constant speed of approx. 9.5cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.

Adjustment procedure:

(1) If does not meet the specification, replace the R Brake Ass'y and check again.

(2) If does not meet the specification in Step (1), replace the Reel Table and check again.



6-2. F FWD / REW TORQUE ADJUSTMENT

. It is required that the Section 5-7-2, T Idler Solenoid Position Adjustment and Section 5-7-3, S Idler Solenoid Position Adjustment are correct before initiating this adjustment.

Mode: F FWD and REW modes

Tool: Reel table torque measurement tape (100 mm dia.)
Tension scale (500 g full scale)

Check procedure:

F FWD Torque

(1) Place the jig tape on the T Reel Table and hook a tension scale to the end of the tape. Pull out the tape.

(2) Put the unit into the F FWD mode. Let the tape be pulled at a constant speed of approx. 9.5cm/sec. Check that the scale reading meets the required specification.

REW Torque

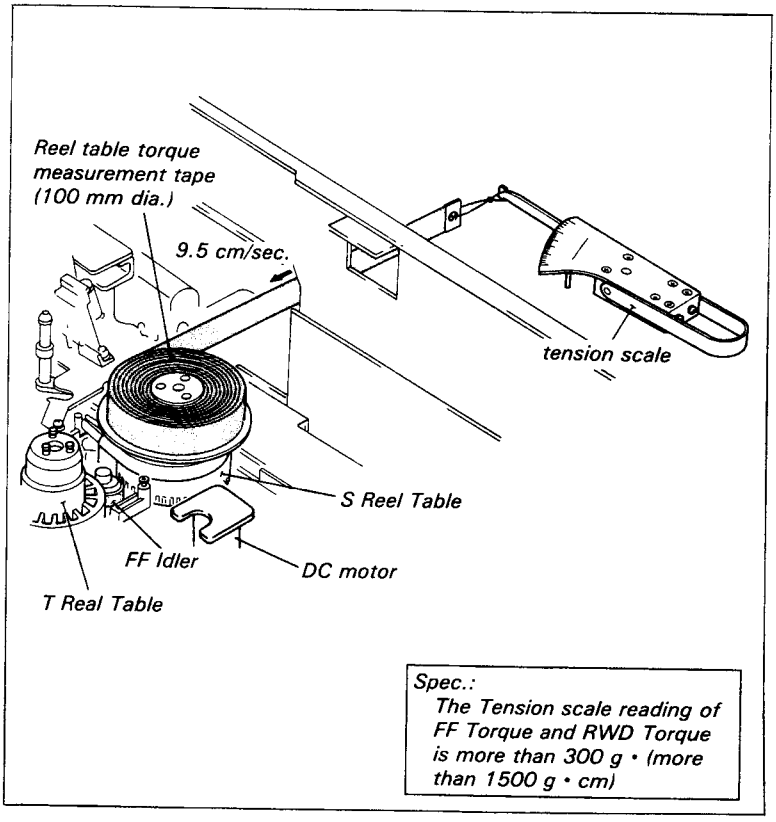
(3) Install the jig tape on the S Reel Table and hook a tension scale to the end of the tape. Pull out the tape.

(4) Put the unit into the REW mode. Let the tape be pulled at the constant speed of approx. 9.5cm/sec. Check that the scale reading meets the required specification.

Adjustment procedure:

Both F FWD Torque and REW Torque are adjusted by the following adjustment procedures.

(1) Clean the surface of the Reel Table, FF idler and belt with a cloth moistened with cleaning fluid. Check the torque again.



Spec.:
The Tension scale reading of FF Torque and RWD Torque is more than 300 g • (more than 1500 g • cm)

(2) If Step (1) does not meet the specification, put the unit into F FWD or REW mode without a cassette tape. Check that the dc voltage at the terminals of the dc motor is 10.5 ± 1.5V. If the dc voltage is out of specification, check that the circuit operation of the SY Board operates correctly.

(3) If does not meet the specification in Steps (1) and (2), replace the Reel Table, FF idler and belt.

6-3. FWD TORQUE ADJUSTMENT

Tool: Special shorting clip
(Refer to the figure.)

Mode: 1/2 FWD SEARCH mode

Check procedure:

(1) Insert a KCS-20 cassette tape wound to the tape end portion.

(2) Put the unit into the FWD SEARCH X 5 mode.

(3) Short between TP3 on the SY-106 Board and GND with a shorting clip.

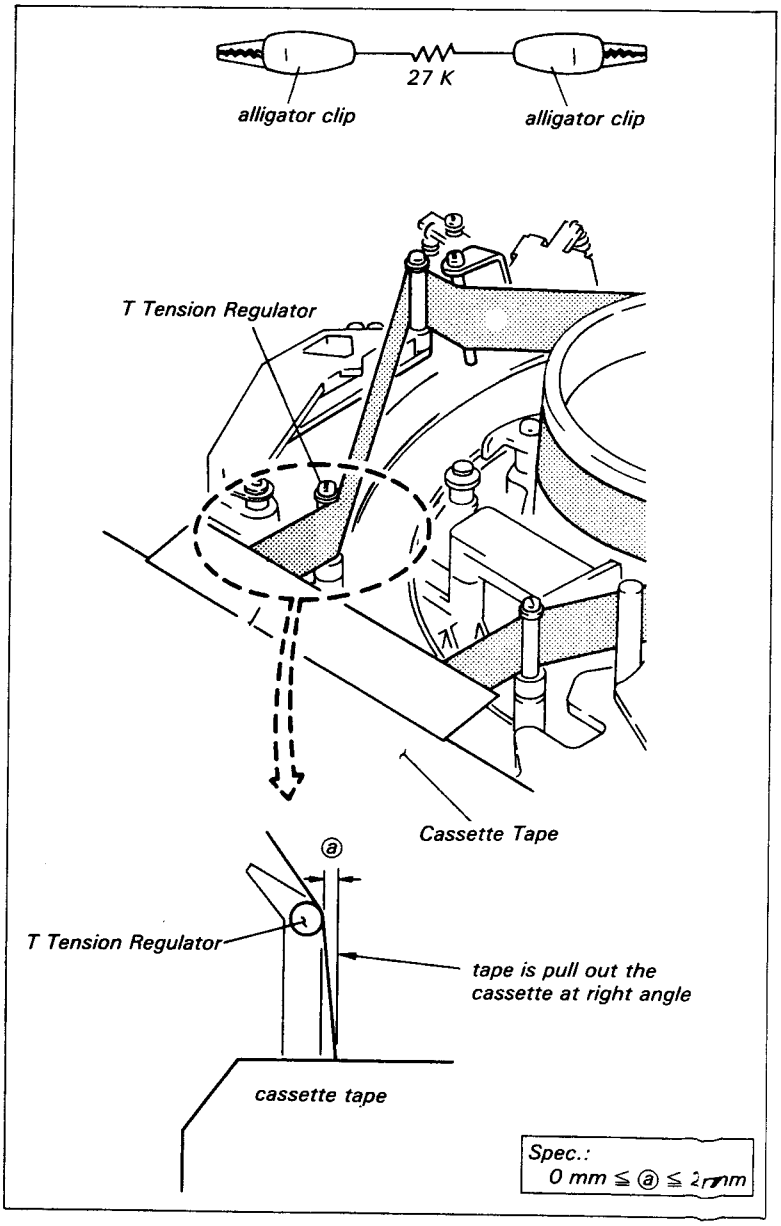
(4) Short between TP11 on the SV-93C Board and GND with a shorting clip.

(5) Short between pin 5 of IC 20 on the SV-93C Board and GND with the special shorting clip. (The unit is put into the FWD SEARCH mode.

(6) Check that the relationship between the T Tension Regulator Arm and cassette tape meets the required specification.

Adjustment procedure:

(1) Adjust RV3 on the SY-106 Board until it meets the required specification in the FWD mode.



6-4. REV TORQUE ADJUSTMENT

Tool: Spcial shorting clip
(Refer to Section 6-3.)

Mode: 1/2 REV SEARCH mode

Check procedure:

(1) Insert a KCA-60 cassette tape wound to the tape beginning portion.

(2) Put the unit into the FWD SEARCH X 5 mode.

(3) Short between TP3 on the SY-106 Board and GND with a shorting clip.

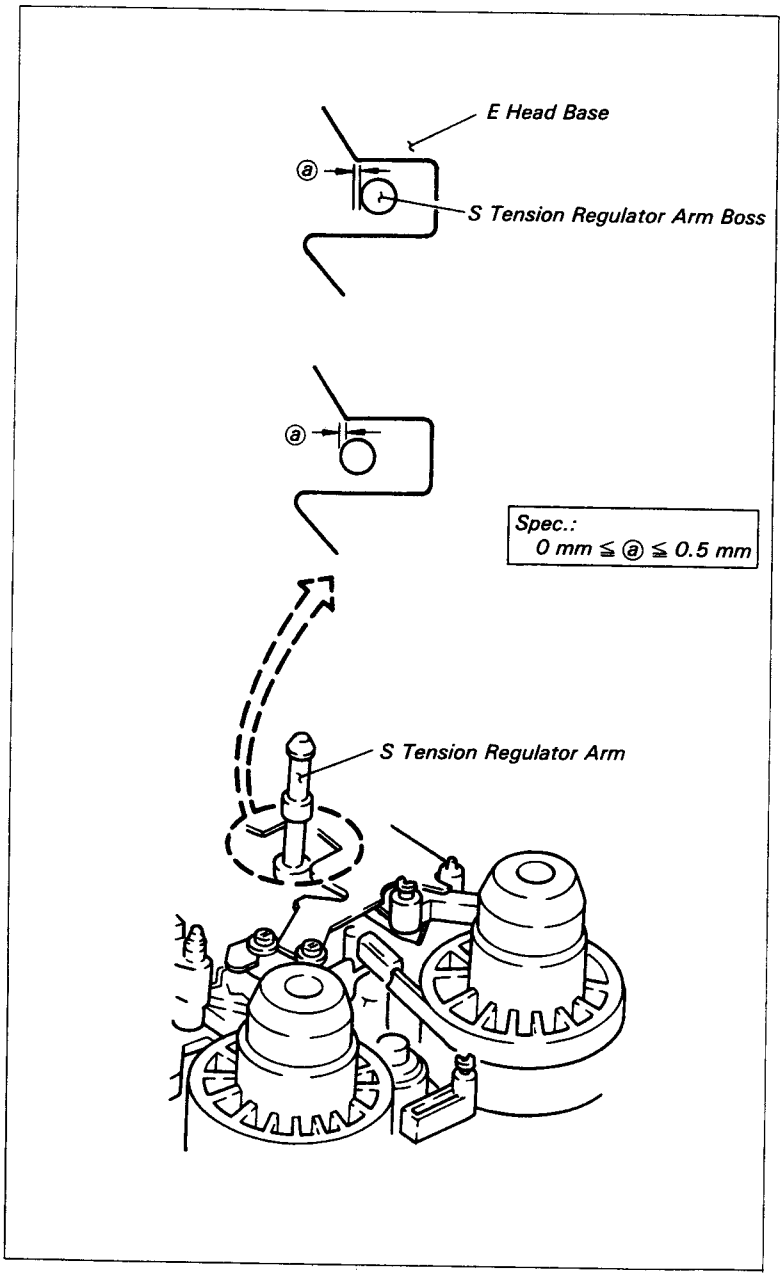
(4) Short between TP11 on the SV-93C Board and GND with a shorting clip.

(5) Short between pin 5 of IC 20 on the SV-93C Board and GND with the special shorting clip. (The unit is put into the FWD SEARCH mode.

(6) Check that the relationship between the S Tension Regulator Boss and the bracket of the Erase Head Base meets the required specification.

Adjustment procedure:

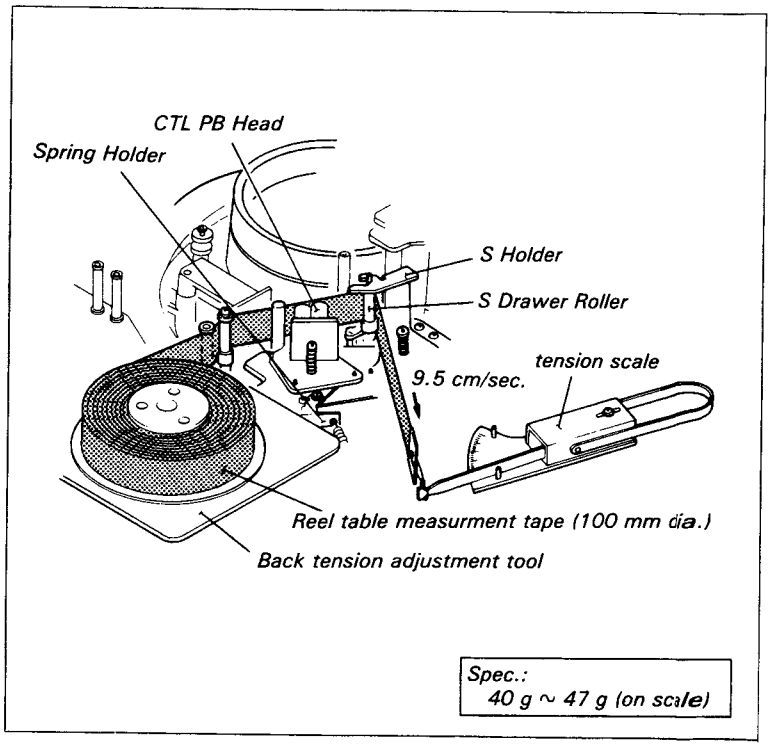
(1) Adjust RV2 on the SY-106 Board until it meets the required specification.



6-5. F FWD BACK TENSION ADJUSTMENT

. It is required that the Section 5-6-3, S Tension Regulator Operating Position Adjustment is correct before initiating this adjustment.
. It is required that the Section 6-6, FWD Back Tension Adjustment is performed after this adjustment.

Tool: Back tension adjustment jig
Reel table torque measurement tape (100 mm dia.)
Tension scale (50 g full scale)



Preparation:

(1) Turn the power ON and put the unit into the FR-STOP mode. (When the power is ON, the S Drawer Arm moves and the unit automatically enters the FR-STOP mode.)
(2) Turn the Pulley of Gear Box Block by hand in the direction of the Threading Ring until the S Drawer Roller is in front of the CTL PB Head.
(3) Place the Back Tension Adjustment Jig.
(4) Place the jig tape on the S Reel Table and pull out the tape as shown in the figure. Check that the tape does not curl at the flange of the S Drawer Roller.
(5) Turn the Pulley in the opposite direction in Step (2) until the S Drawer Roller is engaged with the S Holder.
(6) Hook a tension scale to the end of the tape.

Check procedure:

(1) Press the F FWD button and put the unit into the F FWD mode.
(2) Pull out a tape at a constant speed of approx. 9.5cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.

Adjustment procedure:

(1) Move the position of the Spring Holder with a flatblade screwdrivers (3mm dia.) to meet the required specification.
(2) After the adjustment, perform the check procedures again.
(3) Perform the Section 6-6, FWD Back Tension Adjustment.

6-6. FWD BACK TENSION ADJUSTMENT

. It is required that the Section 5-6-3, S Tension Regulator Operating Position Adjustment and the Section 6-5, F FWD Back Tension Adjustment are correct before initiating this adjustment.

Tool: Back tension adjustment jig
Reel table torque measurement tape (100 mm dia.)
Tension scale (100 g full scale)

Preparation:

(1) Push the Skew Lock Arm in the direction of the arrow.

(2) Turn the power ON and put the unit into the FR-STOP mode. (When the power is ON, the S Drawer Roller moves and the unit automatically enters the FR-STOP mode.)

(3) Turn the pulley of Gear Box Block by hand in the direction of the Threading Ring until the S Drawer Roller is in front of the CTL PB Head.

(4) Place the Back Tension Adjustment Jig.

(5) Place the jig tape on the S Reel Table and pull out the tape as shown in the figure. Check that the tape does not curl at the flange of the S Drawer Roller.

(6) Turn the Pulley of the Gear Box in opposite direction in Step (3) until the S Drawer Roller is engaged with the S Holder.

(7) Hook a tension scale to the end of tape.

Check procedure:

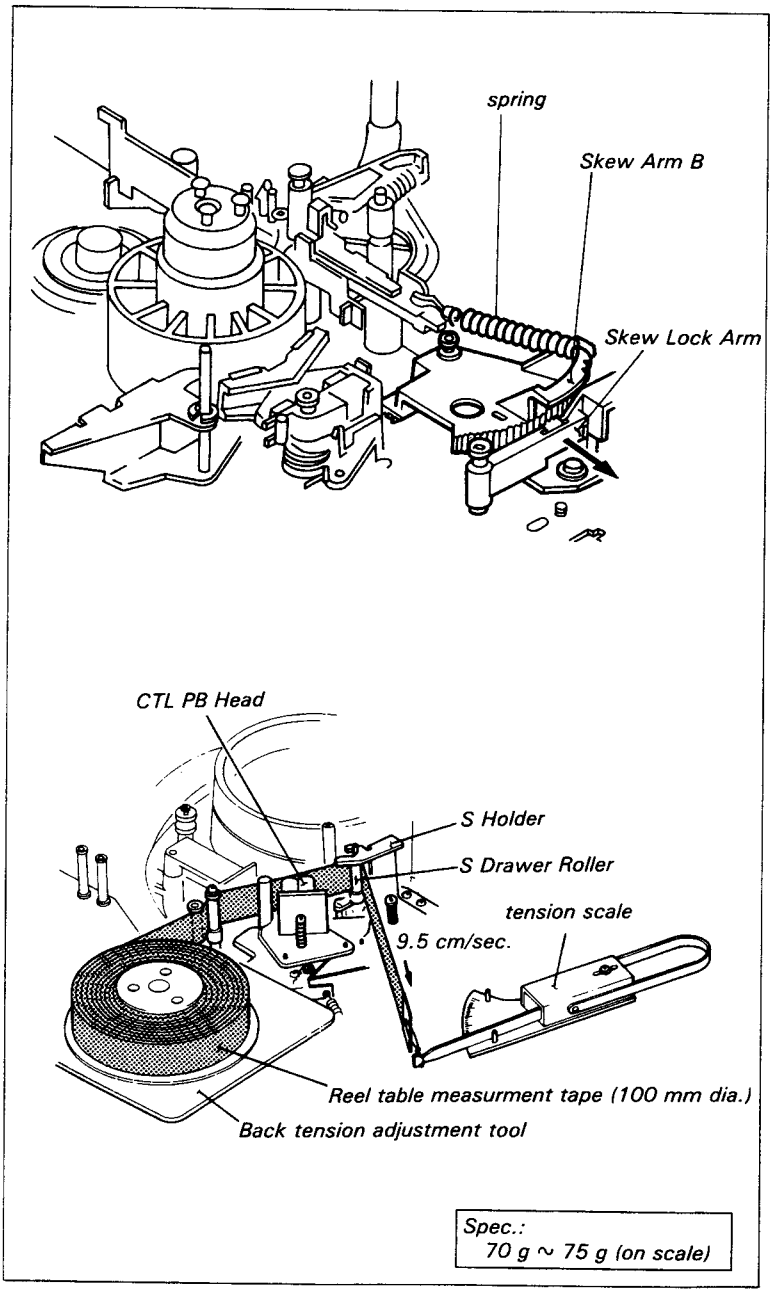
(1) Press the PLAY button and put the unit into the PLAY mode.

(2) Pull out the tape at a constant speed of approx. 9.5cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.

Adjustment procedure:

(1) Adjust the position of the proper spring hook of the Skew Arm B to meet the required specification.

(2) After adjustment, perform the check procedures again.



SECTION 7
TAPE RUN ALIGNMENT

7-1. F FWD/REW MODES TAPE PATH ADJUSTMENT

Mode: F FWD and REW modes

Check procedure:

(1) Inserat a KCA-60 cassette tape which has advanced about half way through (about 30 minutes). Put the unit into the REW mode.

(2) Check that the tape tension is equal around the T Drawer Arm. (Spec.1)

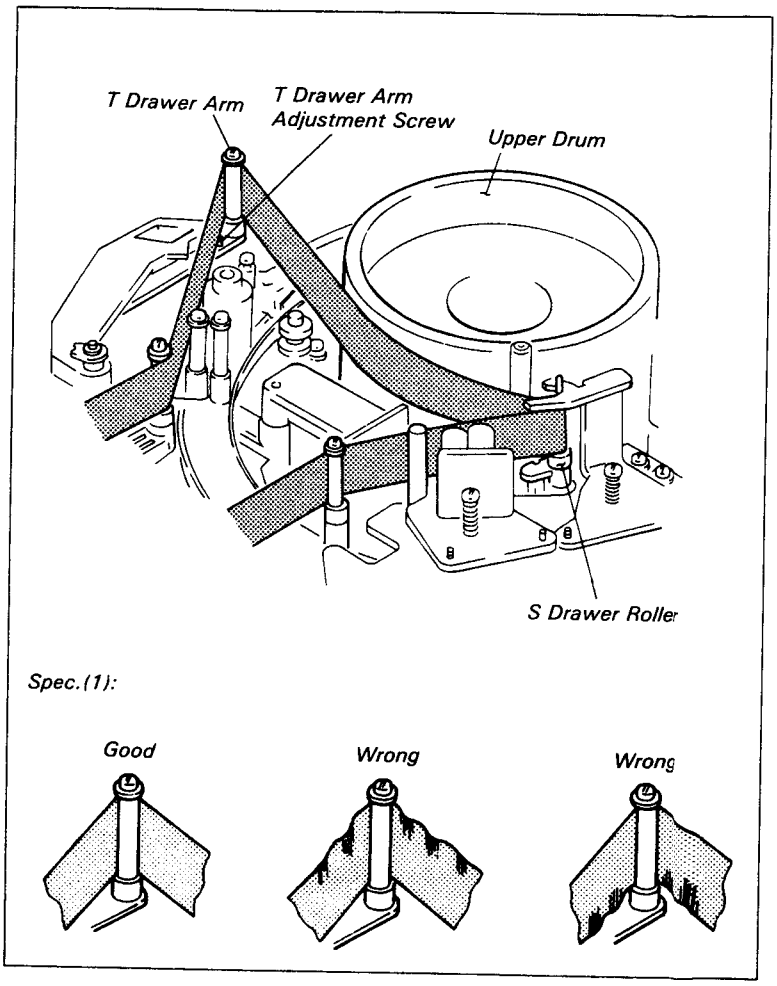
(3) Check that the tape runs without any curling at the upper or lower flange of the S Drawer Roller in the REW mode. (Spec. 2)

(4) Put the unit into the STOP mode, and then into the REW mode. Check that the tape runs without any curling at the S Drawer Roller at the moment just after entering the REW mode. (Spec. 3)

(5) Put the unit into the F FWD mode. Check that the tape runs without any curling at the S Drawer Roller and T Drawer Arm at the moment of just after entering the F FWD mode. (Spec. 4)

Adjustment procedure:

(1) Adjust the slantness of the T Drawer Arm by turning the T Drawer Arm Adjustment Screw.



7-2. T CORRECTION GUIDE SLANTNESS ADJUSTMENT

Tool: Dental mirror

Check procedure:

(1) Insert a KCA-60 cassette tape and put the unit into the FR-STOP mode. Just as the Pinch Roller passes in front of the T Correction Guide, quickly turn the power OFF.

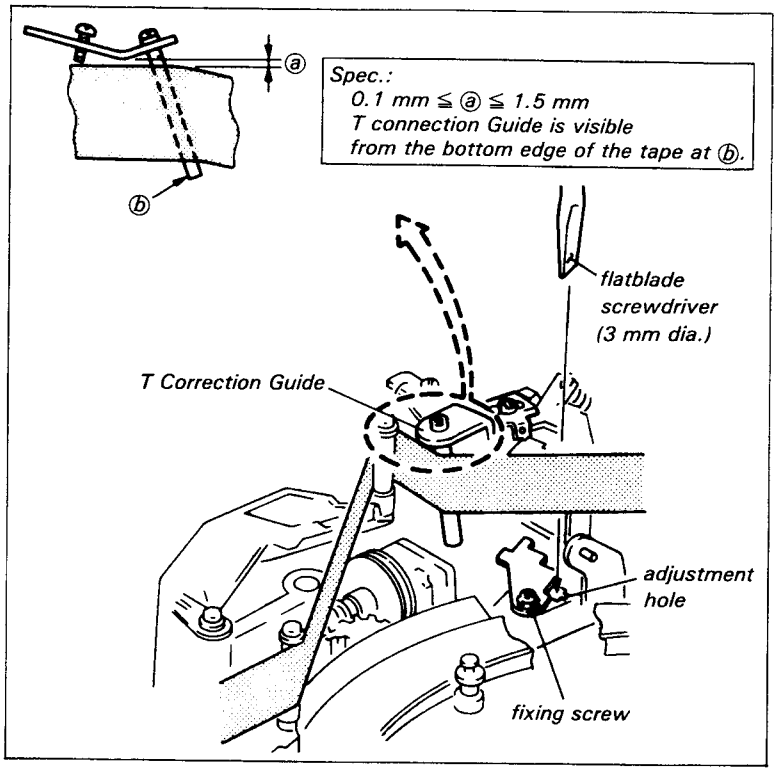
(2) Check that the clearance between the upper bracket of the T Correction Guide and the top edge of the tape meets the required specification.

Adjustment procedure:

(1) Loosen the fixing screw of the T Correction Guide 1/4 to 1/2 turn.

(2) Adjust the position of the T Correction Guide with a flatblade screwdriver (3 mm dia.) to meet the required specification.

(3) After adjustment, perform Section 7-3, PLAY Mode Tape Path Adjustment (1).



7-3. PLAY MODE TAPE PATH ADJUSTMENT (1)

. It is required that Section 7-2, T Correction Guide Slantness Adjustment and Section 7-1, F FWD/REW Modes Tape Path Adjustment are correct before initiating this adjustment.

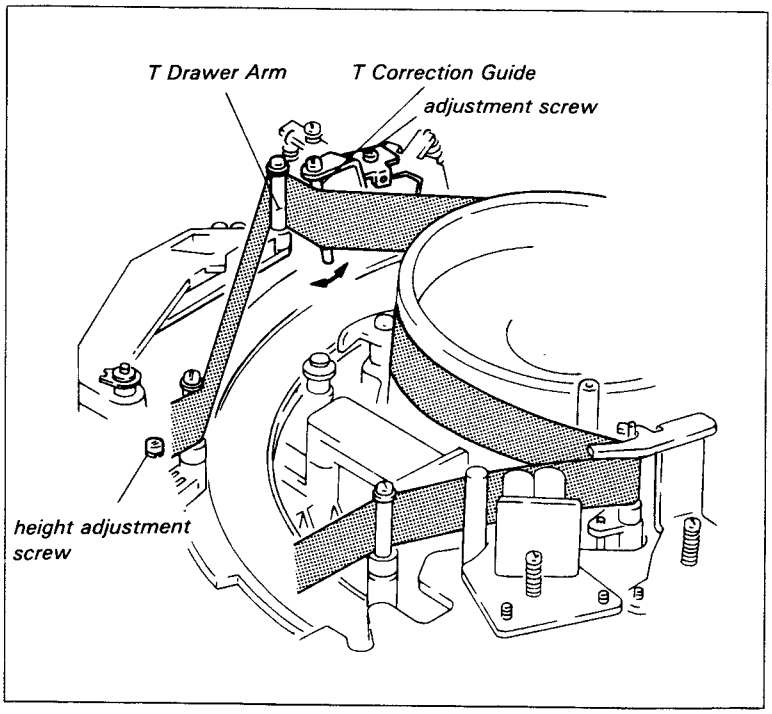
Mode: PLAY mode with a cassette tape

Check procedure:

(1) Insert a KCA-60 cassette tape which has been advanced about half way through (30 minutes). Put the unit into the PLAY mode.

(2) Check that the tape runs without any curling at the upper or lower flange of the T Drawer Guide. (Spec.1)

(3) Check that tape tension is equal at the top and bottom edges of the tape around the T Drawer Guide, and that the tape runs without any curling at the lower flange of the T Drawer Guide. (Spec.2)



Adjustment procedure:

For Spec.1

(1) Adjust the height of the T Drawer Arm by turning the T Drawer Arm Height Adjustment Screw.

For Spec.2

(2) Bend the T Correction Guide in the direction of the arrow. Turn the adjustment screw if necessary to meet the required specification.

7-4. PLAY MODE TAPE PATH ADJUSTMENT (2)

Tool: Dental mirror

Mode: PLAY mode with a cassette tape

Check procedure:

(1) Insert a KCA-60 cassette tape which has been advanced about half way through (30 minutes). Put the unit into the PLAY mode.

(2) At the ※ marks (two positions) in the figure, check that tape tension is equal at the top and bottom edges of the tape. (Spec.1)

(3) Check that the clearance between the lower flange of the Threading Roller and the bottom edge of the tape meets the required specification (2).

Adjustment procedure:

(1) Loosen the fixing screw at the bottom of the Threading Roller.

For Spec.1

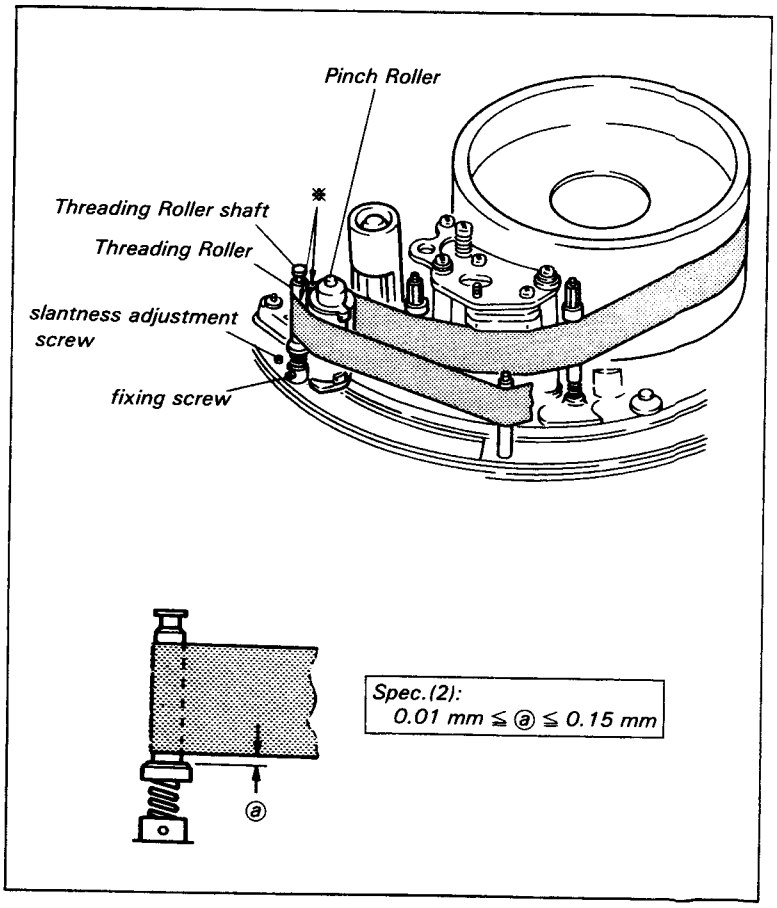
(2) Adjust the slantness of the Threading Roller by turning the slantness adjustment screw.

NOTE:

. After adjustment, perform Section 7-5, REV Mode Tape Path Adjustment and Section 7-6, Tape Path Adjustment Around The Pinch Roller.

For Spec.2

(3) Adjust the height of the Threading Roller by turning the Threading Roller Shaft to meet the required specification.



(4) Check that the slantness and the height meet the required specifications (1) and (2).

(5) After adjustment, tighten the fixing screw of the Threading Roller and perform the check procedure.

7-5. REV MODE TAPE PATH ADJUSTMENT

Check procedure:

(1) Insert a KCA-60 cassette tape which has been advanced about half way through (30 minutes).

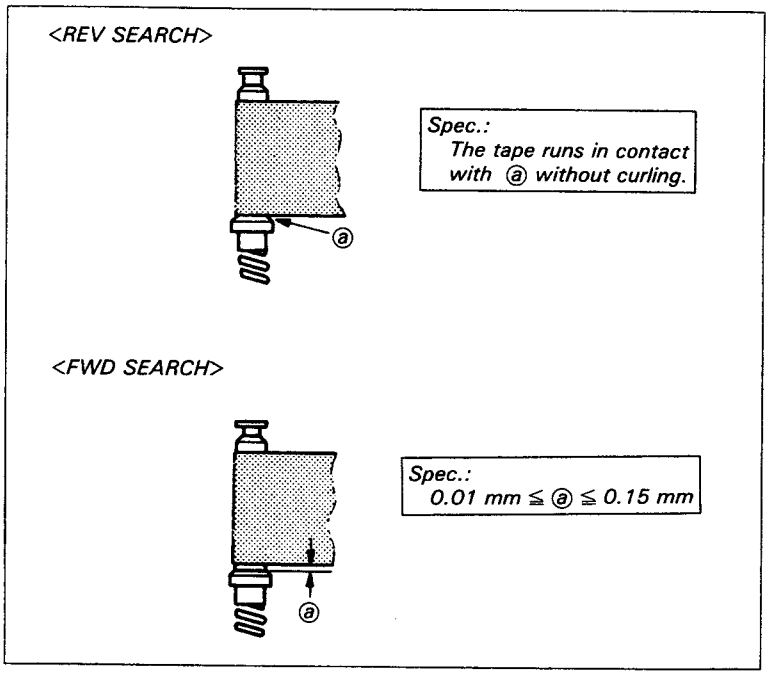
(2) Put the unit into the REV SEARCH mode. Check that the tape runs in contact with the lower flange of the Threading Roller without curling.

(3) Put the unit into the FWD SEARCH mode. Check that the clearance between the lower flange of the Threading Roller and the bottom edge of the tape meets the required specification and the tape does not curl at the lower or upper flange of TG-4.

Adjustment procedure:

(1) Fine adjust the height of the Threading Roller by turning the Threading Roller Shaft.

(2) After adjustment, perform the Section 7-4, PLAY Mode Tape Path Adjustment (2).



7-6. TAPE PATH ADJUSTMENT AROUND PINCH ROLLER

Check procedure:

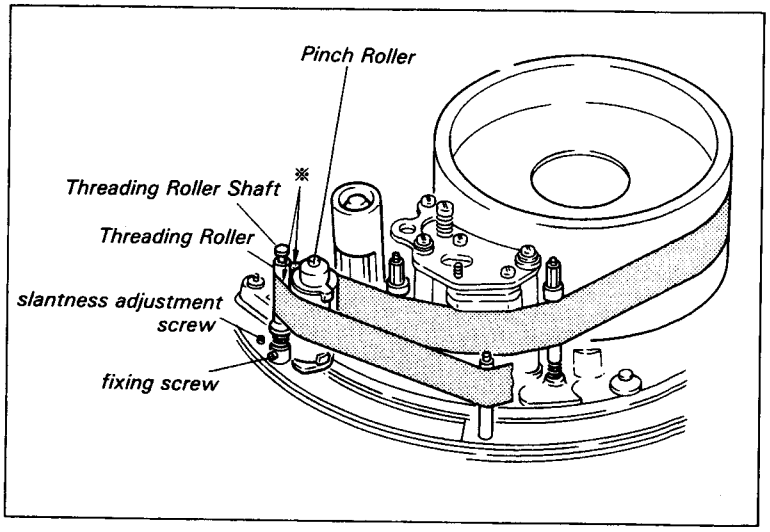
(1) **Insert a KCA-60 cassette tape wound to the tape beginning portion.**

(2) When put the unit into the PLAY, REV SEARCH, FWD SEARCH modes, check that tape wrinkle does not appear, or disappear within 2 sec.

Adjustment procedure:

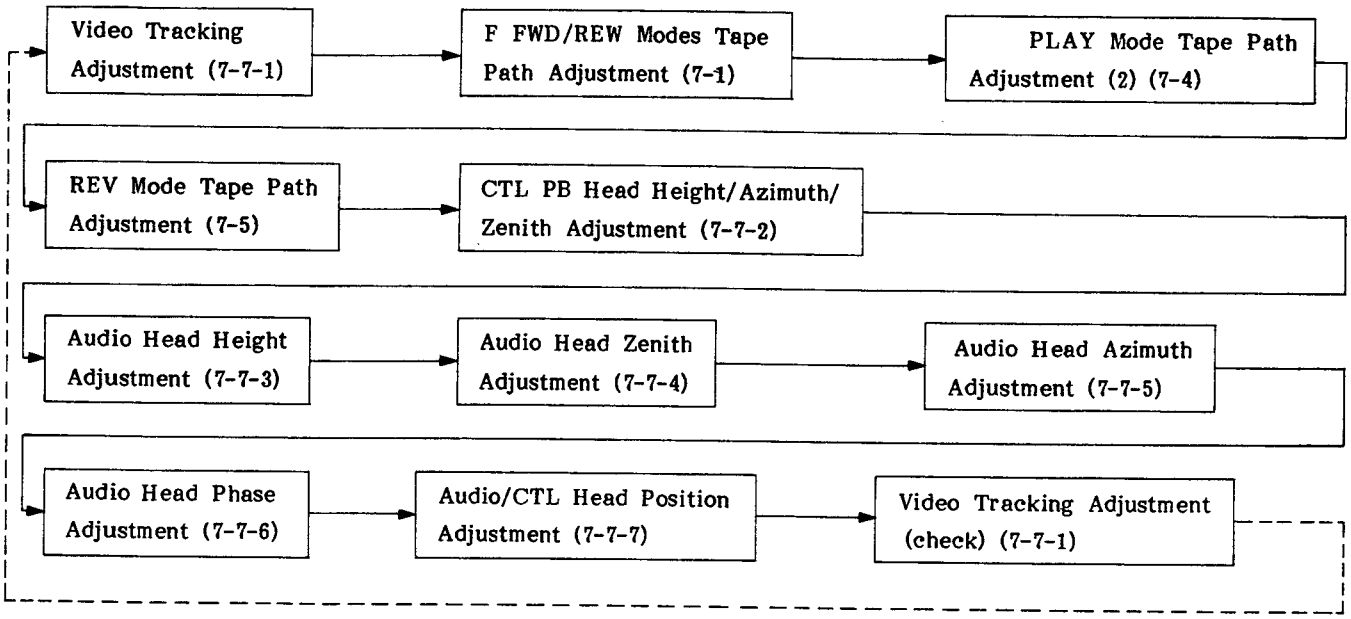
(1) Adjust the slantness and height of the Threading Roller until it meets the required specification.

(2) After adjustment, perform Section 7-4, PLAY Mode Tape Path Adjustment (2), Section 7-5, REV Mode Tape Path Adjustment, and Section 7-7, Tracking Adjustment.



7-7. TRACKING ADJUSTMENT

. Perfomrm the Tracking Adjustment is as follw:
(Numbers in the parenthesis refer to Section Nos.)


Video Tracking Adjustment (7-7-1)
F FWD/REV Modes Tape Path Adjustment (7-1)
PLAY Mode Tape Path Adjustment (2) (7-4)
REV Mode Tape Path Adjustment (7-5)
CTL PB Head Height/Azimuth/ Zenith Adjustment (7-7-2)
Audio Head Height Adjustment (7-7-3)
Audio Head Zenith Adjustment (7-7-4)
Audio Head Azimuth Adjustment (7-7-5)
Audio Head Phase Adjustment (7-7-6)
Audio/CTL Head Position Adjustment (7-7-7)
Video Tracking Adjustment (check) (7-7-1)

7-7-1. Video Tracking Adjustment

Tool: Alignment tape, RR2-1SD PAL
Flatness Plate
Oscilloscope
Dental mirror

Preparation:

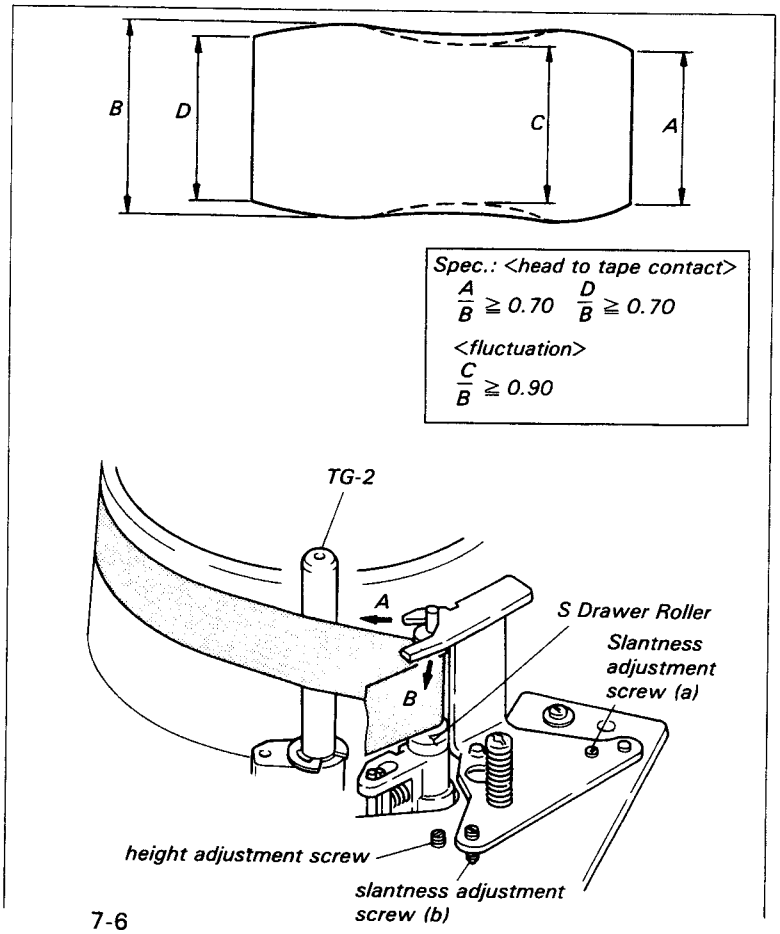
(1) Connect the oscilloscope to TP103 on the VO-17 Board and TP16 on the CO-7 Board.

(2) Playback the color-bar signal portion of the alignment tape.

Check procedure:

(1) While turning the TRACKING control knob, check that the RF waveform maintains a flat envelope while the amplitude increases and decreases.

(2) Check that fluctuation and head-to-tape contact of the RF envelope are within the specification at the center detent position of the TRACKING control knob.



Adjustment procedure:

. The S Drawer Roller Block has three adjustment screws. These three adjustment screws function as follows:

(i) Slantness adjustment screw (a)

Turn this screw in the clockwise direction, and the S Drawer Roller slants in the direction of arrow A.

(ii) Slantness adjustment screw (b)

Turn this screw in the counterclockwise direction, and the S Drawer Roller slants in the direction of arrow B. This screw is used for removing tape curl at the upper flange of the S Drawer Roller. However, this screw is used only when the tape curls at the flange of the S Drawer Roller, even though the RF output waveform meets the required specification.

(iii) Height adjustment screw

Turn this screw in the clockwise direction, and the height of the S Drawer Roller lowers.

. When tape guides (TG-3, TG-4) are adjusted, loosen the locking screw about 1 turn and adjust the height by turning the height adjustment nut.

. **When tracking at the entrance side of the drum is not good.**

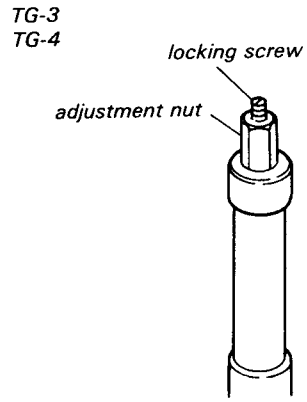
(1) Turn the TRACKING control knob until the RF envelope amplitude is 70 to 80 % of maximum.

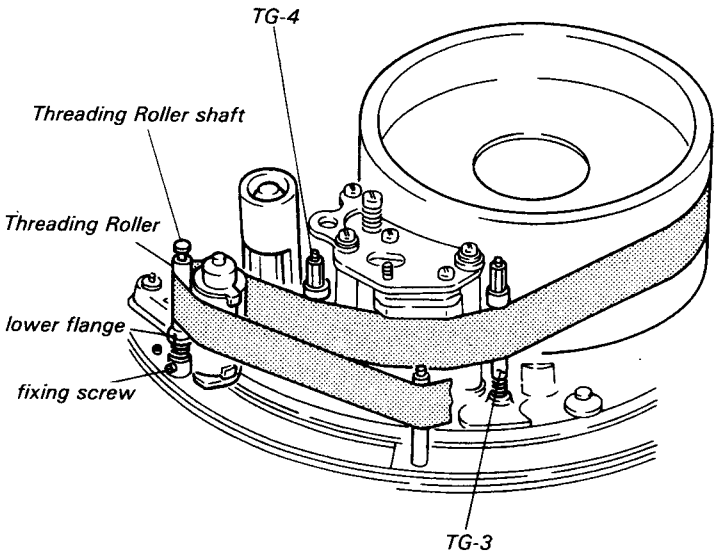
(2) Adjust the height and the slantness of the S Drawer Roller by turning the height adjustment screw and the slantness adjustment screw (a) until the RF envelope of the entrance side is flat.

NOTE:

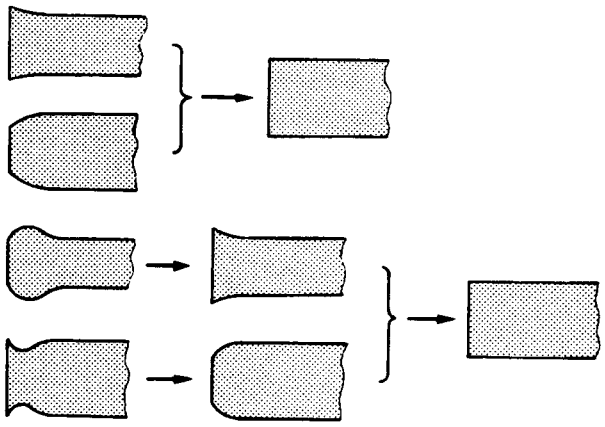
(i) Check the surface of the running tape very carefully around the S Drawer Roller. Check that tape tension is equal at the top and bottom of the tape.

(ii) Check that the tape runs in contact with the upper flange of the S Drawer Roller without any curling.





<entrance side>



. **When tracking at the center of the drum is not good.**

(It is required that the Tracking adjustment at the entrance side of the drum is correct before initiating this adjustment.)

(3) Turn the TRACKING control knob until the RF envelope amplitude is 70 to 80% of maximum.

(4) Adjust the height and the slantness of the S Drawer Roller by turning the height adjustment screw and the slantness adjustment screw (a) until the RF envelope at the center of the drum is flat.

NOTE:

(i) Adjust the slantness adjustment screw (a) in the clockwise direction within a 10 degree angle.

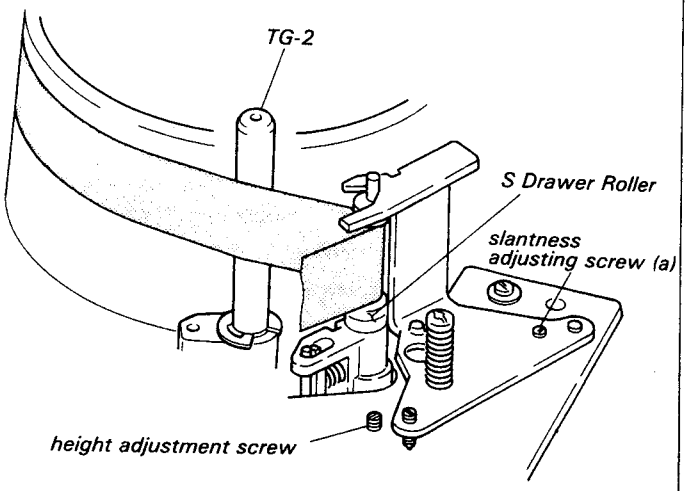
(ii) When the tracking of the center of the drum is adjusted, the FR envelope at the entrance side of the drum should remain flat.

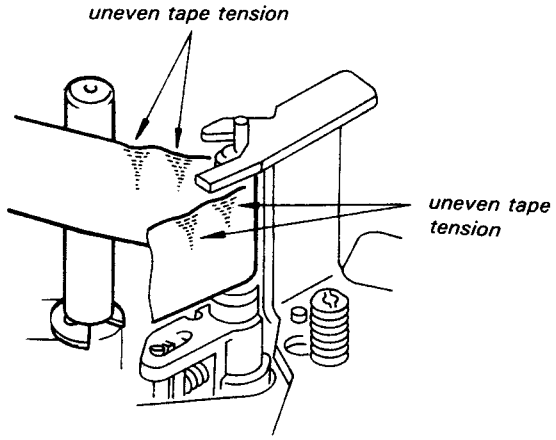
(iii) Check that the tape runs in contact with the upper flange of the S Drawer Roller without any curling.

(5) If the RF envelope is not flat in Step (4), adjust the height of TG-3 and TG-4.

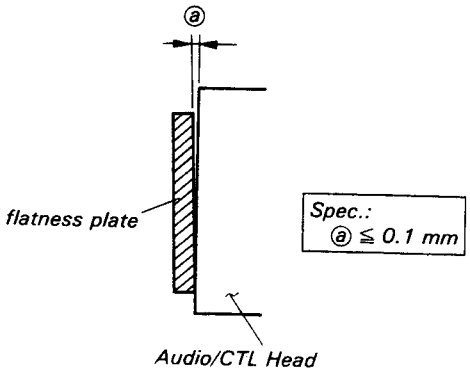
(6) If the RF envelope is not flat in Steps (4) and (5), adjust the zenith of the Audio/CTL Head within the allowable range. Adjust the height of TG-3 and TG-4 again.

(7) Check that the clearance between the bottom edge of the tape and the lower flange of the Threading Roller is 0.01 mm to 0.15 mm. If it is out of the specification, adjust the height of the Threading Roller by turning the the Threading Roller Shaft.





<zenith adjustment for the Audio/CTL Head>



. When loosen the fixing screw of the Threading Roller, press the STOP button. When the Threading Roller comes near the Sug-ring Stopper, turn the power OFF. Loosen the fixing screw of the Threading Roller with a L-shaped hexagonal wrench. After adjustment, tighten the fixing screw and check that it meet the required specification.

. When tracking at the exit side of the drum is not good.

(8) Turn the TRACKING control knob until the RF envelope amplitude is 70 to 80% of maximum.

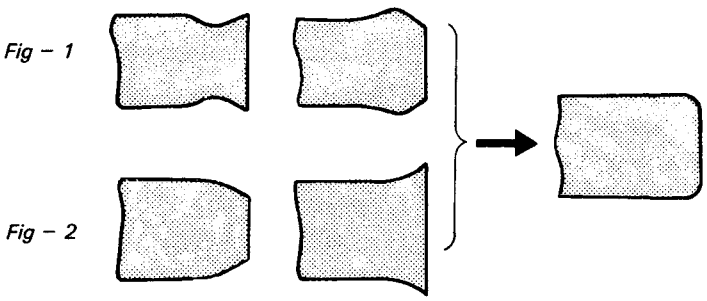
(9) If the RF envelope is not flat as shown in the figure 1, adjust the height of TG-4 until the RF envelope is flat. After this adjustment, adjust the height of TG-3 so that the tape runs in contact with the upper flange. If the RF envelope is not flat as shown in the figure 2, adjust the height of TG-3 and TG-4 until the RF envelope is flat. If it is not, adjust the zenith of the Audio/CTL Head within the allowable range. Adjust the height of TG-3 and TG-4 again.

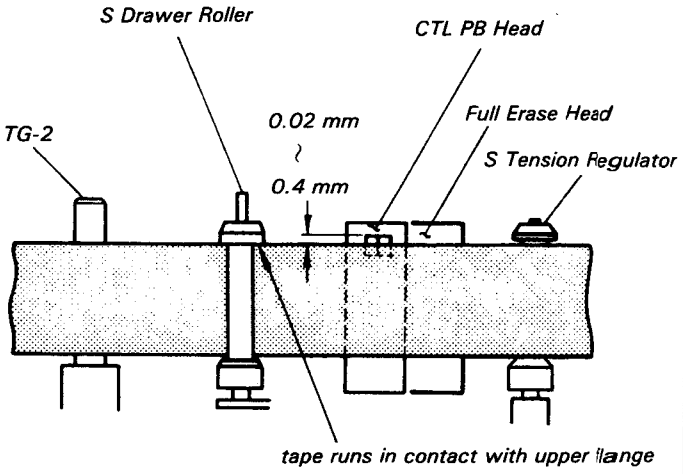
(10) Check that the clearance between the bottom edge of the tape and the lower flange of the Threading Roller is 0.01 mm to 0.15 mm. If it is out of the specification, adjust the height of the Threading Roller by turning the Threading Roller Shaft.

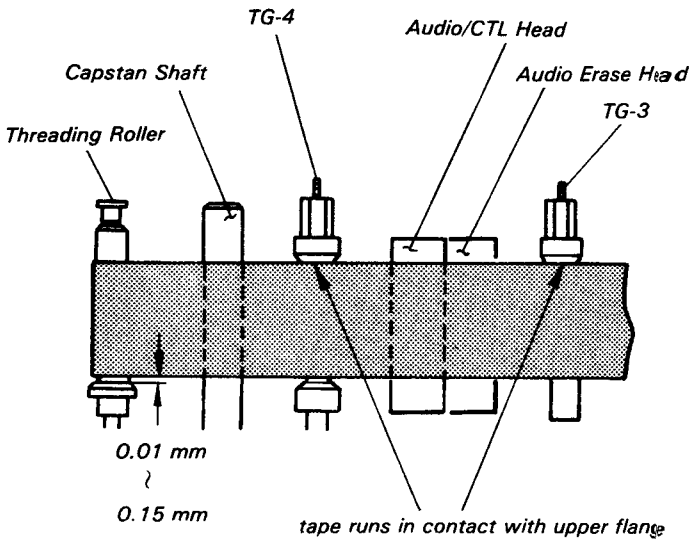
<entrance side>

Fig – 1

Fig – 2







7-7-2. CTL PB Head Height/Azimuth/Zenith Adjustments

. The CTL PB Head Height, Azimuth, and Zenith Adjustments are closely related. When performing any of these adjustments, always perform the other two adjustments at the same time.

Tool: Flatness plate

Check procedure:

(1) Check that top and bottom clearances between the Full Erase Head and TG-1 meets the required specification. (Spec. 2 : azimuth check)

(2) Check that the clearance between the Full Erase Head and the Flatness Plate meets the required specification, when the flatness plate is placed on the Full Erase Head and TG-1. (Spec. 3 : zenith check)

(3) Insert a cassette tape, and put the unit into the PLAY mode.

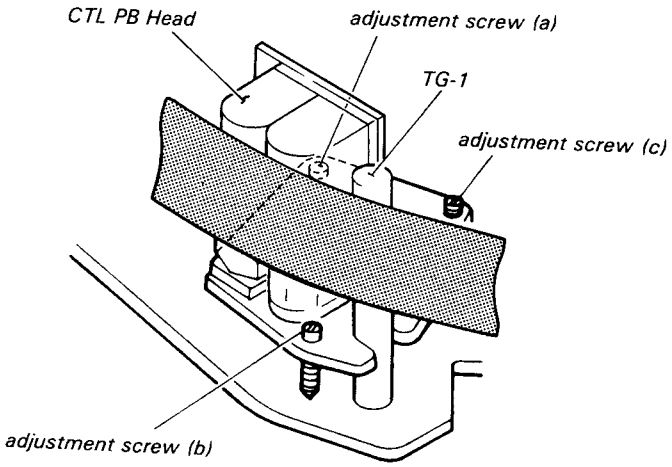
(4) Check that the relationship between the top edge of tape and the CTL PB Head meets the required specification. (Spec. 1 : height check)

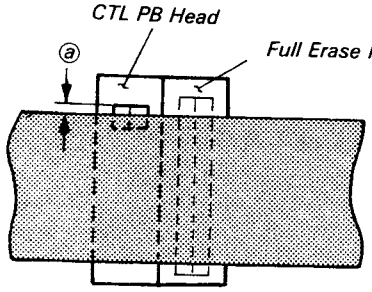
Adjustment procedure:

(1) Adjust adjustment screw (a) to meet the required specification (2).

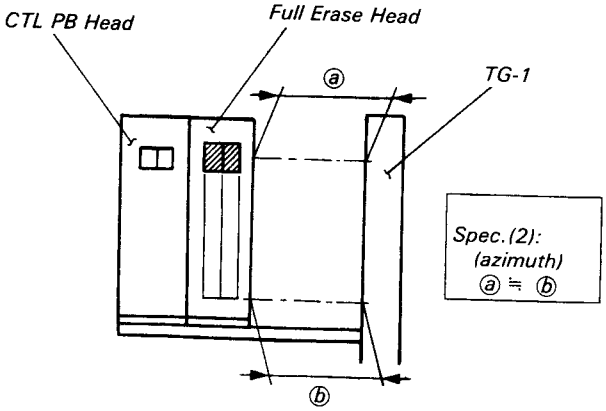
(2) Adjust adjustment screw (b) to meet the required specification (3).

(3) Turn the three adjustment screws an equal amount in the clockwise or counterclockwise direction to meet the required specification (1).

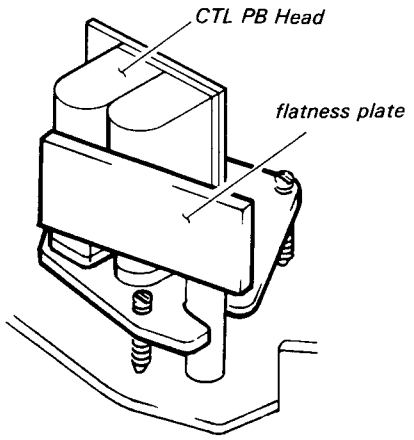


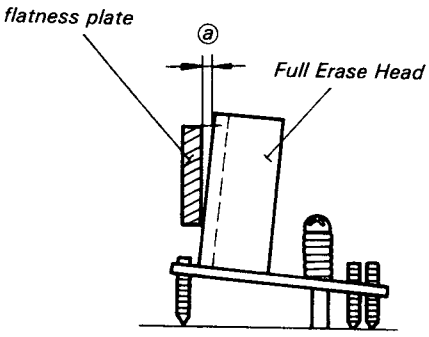


Spec.(1):
(height)
0.02 mm ≦ ⓐ ≦ 0.4 mm

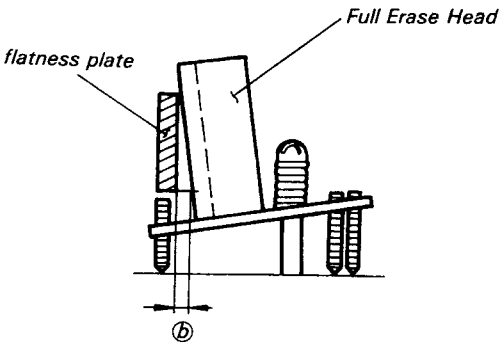


Spec.(2):
(azimuth)
ⓐ ≒ ⓑ





Spec.(3):
(zenith)
ⓐ ≦ 0.1 mm



7-7-3. Audio Head Height Adjustment

Tool: Alignment tape, RR5-1SD PAL
VTVM or oscilloscope

Preparation:

(1) Connect the VTVM or oscilloscope to the AUDIO OUT CH-1 and CH-2 connectors of the connector panel.

(2) Playback the audio 1 kHz signal portion of the alignment tape.

Check procedure:

(1) Check that the CH-1 output level increase is less than 0.5 dB when pressing down at A. If it is out of the specification, perform adjustment procedures (1) and (2).

(2) Check that the CH-2 output level increase is less than 0.5 dB when pushing up at B. If it is out of the specification, perform adjustment procedures (3) and (4).

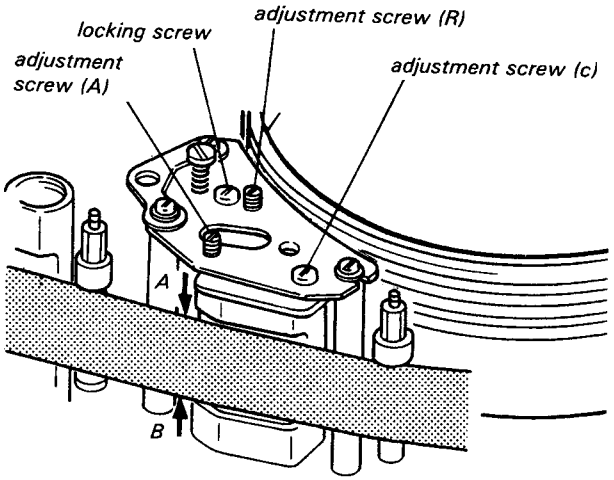
Adjustment procedure:

(1) Loosen the locking screw and turn adjustment screws (R) and (A) an equal amount in the counterclockwise direction. Turn adjustment screw (C) the same amount in the clockwise direction.

(2) Tighten the locking screw and check the height of the Audio Head as described in the check procedure.

(3) Loosen the locking screw and turn adjustment screws (R) and (A) an equal amount in the clockwise direction. Turn the adjustment screw (C) the same amount in the counterclockwise direction.

(4) Tighten the locking screw and check the height of the Audio Head as described in the check procedure.



Spec.:
- *The level increase of the CH-1 is less than 0.5 dB when pressing down at A.*
- *The level increase of the CH-2 is less than 0.5 dB when pushing up at B.*

7-7-4. Audio Head Zenith Adjustment

Tool: Flatness Plate

Check procedure:

(1) When the Flatness Plate is set on the Audio Head and TG-3, check that the clearance between the Audio Head and the Flatness Plate meets the required specification.

Adjustment procedure:

. When the clearance is out of spec. at the top of the Audio Head.

(1) Turn adjustment screw (R) in the counterclockwise direction.

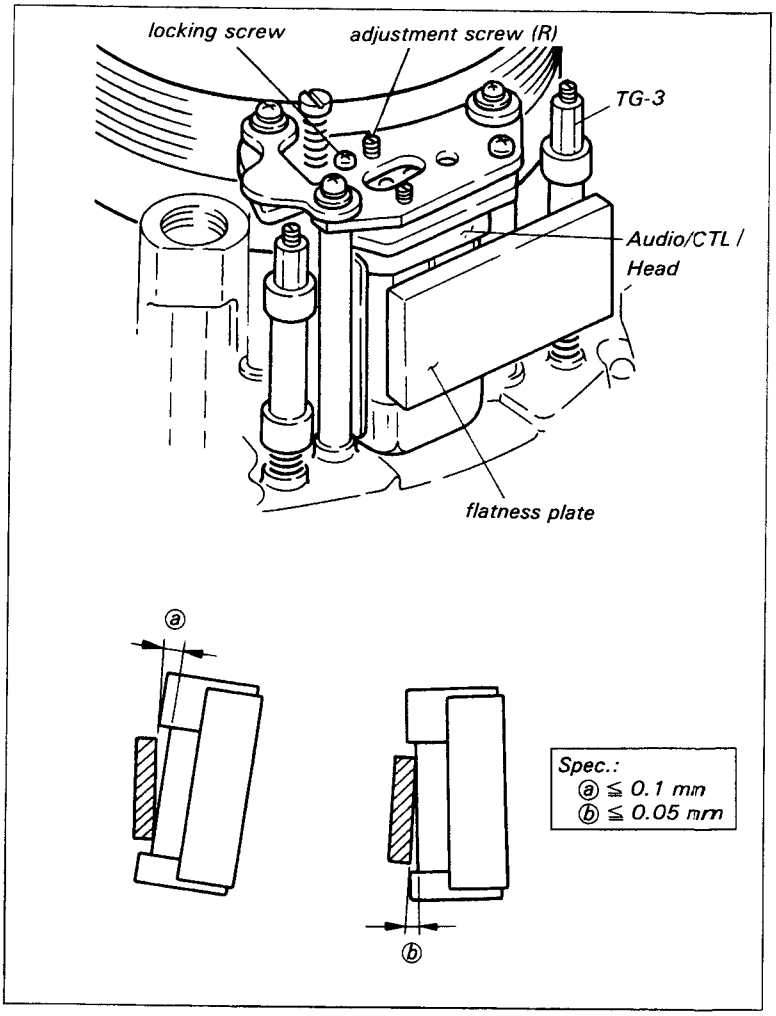
(2) Tighten the locking screw and check the zenith again.

. When the clearance is out of spec. at the bottom of the Audio Head.

(3) Loosen the locking screw 1/4 to 1/2 turn.

(4) Turn adjustment screw (R) in the clockwise direction.

(5) Tighten the locking screw and check the zenith again.



7-7-5. Audio Head Azimuth Adjustment

Tool: Alignment tape, RR5-1SD PAL
VTVM or oscilloscope

Preparation:

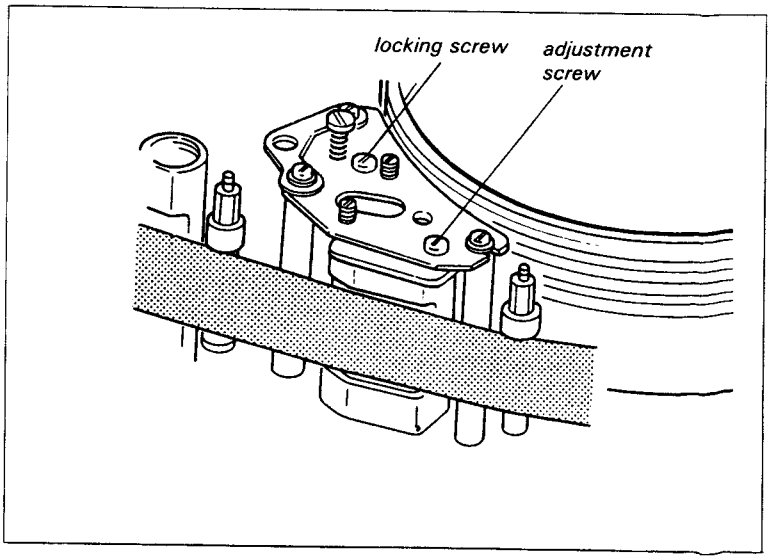
(1) Connect the VTVM or oscilloscope to the AUDIO OUT CH-1 or CH-2 connector of the connector panel.

(2) Playback the audio 10 kHz signal portion of the alignment tape.

Adjustment procedure:

(1) Loosen the locking screw and adjust the audio output level to maximium by turning the adjustment screw.

(2) Tighten the locking screw and performn the check procedure.



7-7-6. Audio Head Phase Adjustment

Tool: Alignment tape, RR5-1SD PAL
Oscilloscope

Preparation:

(1) Connect the horizontal and vertical terminals of the oscilloscope to the AUDIO OUT CH-1 and CH-2 connectors of the connector panel.

(2) Playback the audio 1 kHz signal portion of the alignment tape.

(3) Adjust the scope for a lissajous waveform with horizontal and vertical amplitudes of 6 cm.

Check procedure:

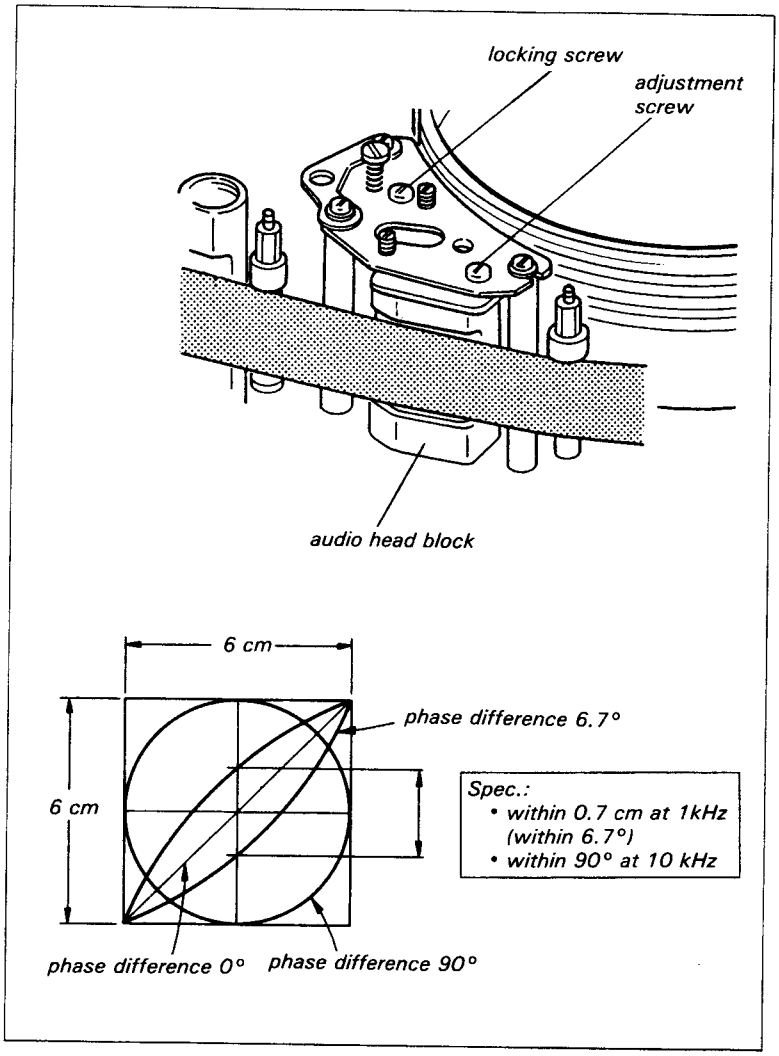
(1) Playback the audio 1 kHz signal portion of the alignment tape, and check that the vertical amplitude at the center in the horizontal direction meets the required specification.

(2) Playback the audio 10 kHz signal portion of the alignment tape, and check that the lissajous waveform meets the required specification.

Adjustment procedure:

(1) Loosen the locking screw 1/4 to 1/2 turn and adjust the phase by turning the adjustment screw.

(2) Tighten the locking screw and check the phase again.



7-7-7. Audio/CTL Head Position Adjustment

Tool: Alignment tape, RR5-1SD PAL
Oscilloscope

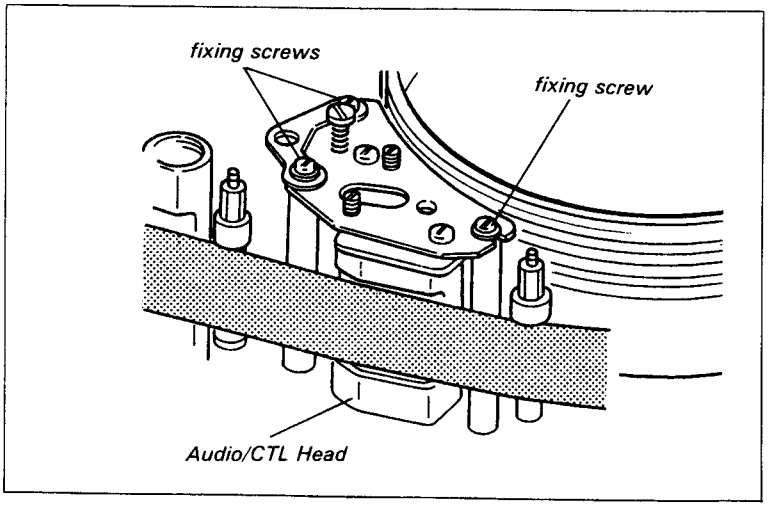
Preparation:

(1) Connect the oscilloscope to TP103 on the VO-17 Board and the EXT.TRIG to TP16 on the CO-7 Board.

(2) Playback the alignment tape.

Check procedure:

(1) While turning the TRACKING control knob, check that the RF envelope has maximum amplitude at the center detent position of the TRACKING control knob.



Adjustment procedure:

(1) Loosen the three fixing screws 1/4 to 1/2 turn.

(2) Adjust the position of the Audio/CTL Head with a eccentric screwdriver to meet the required specification.

7-8. VIDEO HEAD DIHEDRAL ADJUSTMENT

Tool: Dihedral adjustment screwdriver
Alignment tape, RR5-1SD PAL
Monitor TV

Check procedure

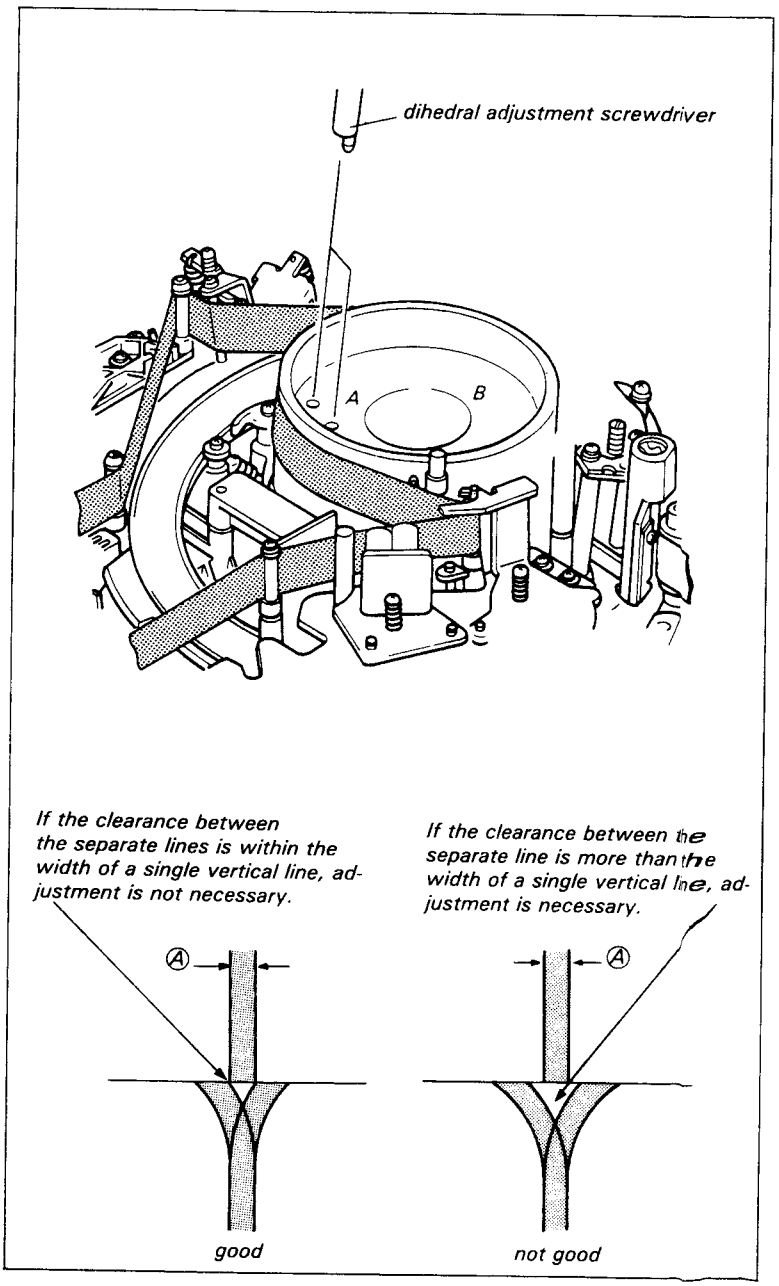
(1) Playback the monoscope signal portion of the alignment tape.

(2) Check the distortion of the monoscope signal under the switching pulse. If the clearance between the separate lines is within the width of a single vertical line, adjustment is not necessary. If the clearance of the separate lines is more than the width of a vertical line, then adjustment is necessary.

Adjustment procedure:

(1) Insert an eccentric screwdriver into the adjustment hole of the white lead and perform the dihedral adjustment.

(2) Play back the monoscope signal portion. If the distortion has become worse, insert an eccentric screwdriver in the other adjustment hole and perform the dihedral adjustment.


dihedral adjustment screwdriver
A
B
If the clearance between the separate lines is within the width of a single vertical line, adjustment is not necessary.
If the clearance between the separate line is more than the width of a single vertical line, adjustment is necessary.
A
A
good
not good

SECTION 8
SYSTEM CONTROL ALIGNMENT

[Equipment Required]

- Oscilloscope
- Frequency Counter
- DC Voltmeter
- Alignment Tape: RR5-1SD PAL (Part No.8-960-036-80) −SP tape−

TIME	VIDEO	AUDIO	TIME CODE
5	Color bars	———	———
3	Gated sweep (B/W)	1 kHz, 0 dB	———
3	Gated sweep (color)	10 kHz, −10 dB	———
3	Pulse & bar (MOD 10T and inverted 2T)	1 kHz, −20 dB (NR: OFF) 40 Hz, −20 dB (NR: OFF) 7 kHz, −20 dB (NR: OFF) 10 kHz, −20 dB (NR: OFF) 15 kHz, −20 dB (NR: OFF)	———
3	Monoscope (color)	1 kHz, −20 dB (NR: ON) 15 kHz, −20 dB (NR: ON)	———
3	Pseudo color bars	———	TIME CODE

8－1. TAPE SENSOR BALANCE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Set the cassette tape. · STOP mode	TP2/SY-106(K-6) 6.0 ± 0.2 V_{dc}	⊘RV1/SY-106(K-6)

8－2. REEL MOTOR STILL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Connect the AC volt meter to the reel motor terminal (orange) and the chassis of the reel chassis block. · Set to the PLAY-PAUSE mode without the cassette tape.	0.4 ± 0.02 V	⊘RV4/SY-106(H-6) (Adjust after the reel stops.)

NOTE : Refer to Sec. 6-2 and 6-3 for the adjustment of RV2 and RV3/SY-106.

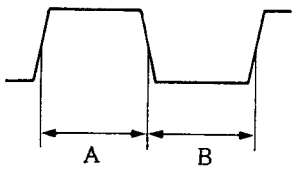
SECTION 9
SERVO SYSTEM ALIGNMENT

[Equipment Required]

- Dual Trace Oscilloscope
- Frequency Counter
- Audio Oscillator
- DC Voltmeter
- Blank Tape
- Alignment Tape: RR5-1SD PAL (Part No.8-960-036-80) −SP tape−

TIME	VIDEO	AUDIO	TIME CODE
5	Color bars	———	———
3	Gated sweep (B/W)	1 kHz, 0 dB	———
3	Gated sweep (color)	10 kHz, −10 dB	———
3	Pulse & bar (MOD 10T and inverted 2T)	1 kHz, −20 dB (NR: OFF) 40 Hz, −20 dB (NR: OFF) 7 kHz, −20 dB (NR: OFF) 10 kHz, −20 dB (NR: OFF) 15 kHz, −20 dB (NR: OFF)	———
3	Monoscope (color)	1 kHz, −20 dB (NR: ON) 15 kHz, −20 dB (NR: ON)	———
3	Pseudo color bars	———	TIME CODE

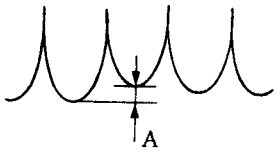
9－1. CAPSTAN FREE SPEED ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
・Play back the color-bar segment of the alignment tape RR5-1SD PAL. ・PLAY mode	TP3/SV-93C(G-4)  A＋B ＝ 100% B ＝ 50 ± 5% (Take reading at the center of jitter.)	◓RV100/SV-93C(G-5) TRIG: INT

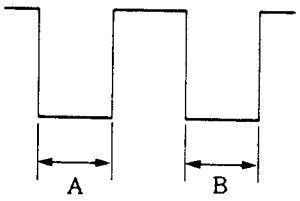
9－2. CAPSTAN 1／30 SPEED ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
・Short between TP3/SV-106(E-1) and TPE1/SV-106(H-2) with a shorting clip. ・Play back the color-bar segment of the alignment tape RR5-1SD PAL. ・SEARCH-PAUSE mode ・Short between TP11/SV-93C(B-5) and E1/SV-93C(A-6) with a shorting clip. ・Turn the SEARCH dial fully clockwise. ・After the adjustment is completed, remove the shorting clips (two points).	TP27/SV-93C(G-4) 60 ± 10 Hz	◓RV101/SV-93C(H-5) TRIG: INT

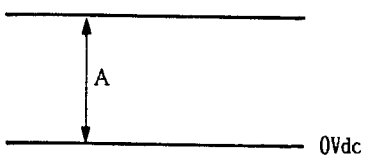
9－3. CAPSTAN STOP SERVO ADJUSTMENT (1)

machine conditions for adjustment	specifications	adjustments
・Play back the color-bar segment of the alignment tape RR5-1SD PAL. ・PLAY mode ・Short between TP16/SV-93C(H-3) and TP19/SV-93C(H-3) with a shorting clip. ・After the adjustment is completed, remove the shorting clip.	TP21/SV-93C(H-2)  A ≦ 0.04 V_{P-P}	◐RV106/SV-93C(H-3) TRIG: EXT TP6/SV-93C(K-2)

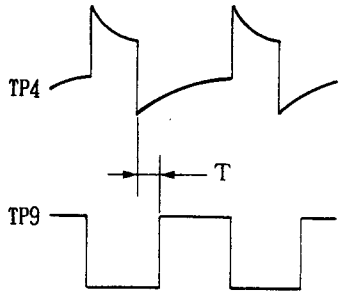
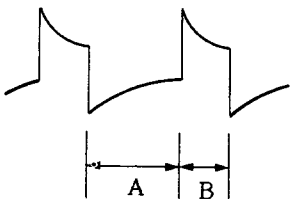
9－4. CAPSTAN STOP SERVO ADJUSUMENT (2)

machine conditions for adjustment	specifications	adjustments
・Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP25/SV-93C(F-3)  A = B $(\frac{B}{A} = 1 \pm 0.1)$	◐RV201/SV-93C(J-3) TRIG: INT

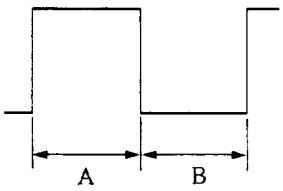
9－5. CAPSTAN STOP SERVO ADJUSTMENT (3)

machine conditions for adjustment	specifications	adjustments
・Play back the color-bar segment of the alignment tape RR5-1SD PAL. ・PLAY-PAUSE mode ・Short between TP6/SV-93C(K-2) and TP22/SV-93C(H-2) with a shorting clip. ・After the adjustment is completed, remove the shorting clip.	TP-26/SV-93C(E-6)  A = 1.0 ± 0.1 V	◐RV107/SV-93C(H-3) TRIG: INT

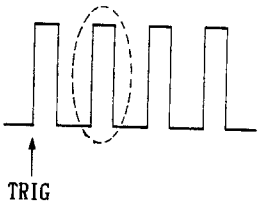
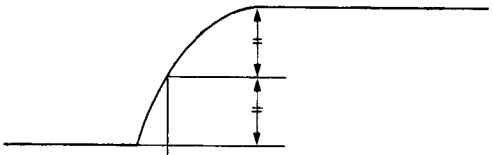
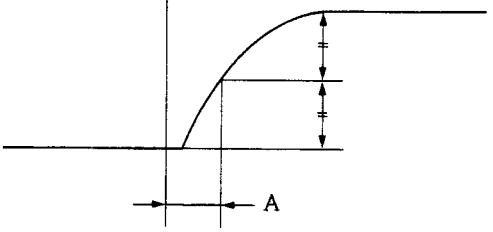
9－6. TRACKING CONTROL MULTI AND CTL POLARITY ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
・Set the TRACKING control to the center position. ・Play back the color-bar segment of the alignment tape RR5-1SD PAL. ・PLAY mode	TP4/SV-93C(L-4) TP9/SV-93C(L-3) Step 1  T = 0 ± 100 μsec (Take reading at the center of jitter.) Step 2  A > B	⊘RV406/SV-93C(H-2) TRIG: TP9/SV-93C(L-3)

9－7. DRUM FREE SPEED ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
・Play back the color-bar segment of the alignment tape RR5-1SD PAL. ・PLAY mode	TP15/SV-93C(E-6)  A+B = 100% A = 50 ± 5%	⊘RV402/SV-93C(N-5) TRIG: INT

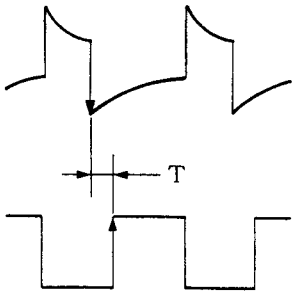
9-8. DRUM AFC LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL. · PLAY and PAUSE modes	TP8/SV-93C(L-6)  NOTE: Magnify the second wave. PLAY mode  PAUSE mode  A = 0 ± 0.1 μsec	●RV2/SV-93C(F-6) TRIG: INT

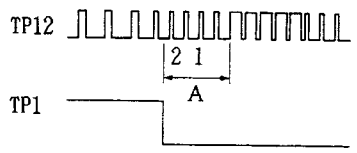
9-9. DRUM AFC TRANSIENT ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL. · PLAY and PAUSE modes	TP-17/SV-93C(D-6) difference between PLAY mode and PAUSE mode 0 ± 0.1 Vdc ① When PAUSE mode, set the wave of TP17 to the center position of oscilloscope by DC. ② Adjust RV1 so as to set to the same position of PAUSE mode in five seconds when PLAY mode.	●RV1/SV-93C(F-6) TRIG: INT

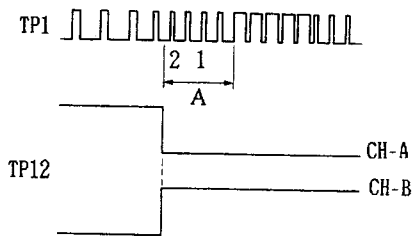
9-10. INSTANT START ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Set the TRACKING control to the center position. · Play back the color-bar segment of the alignment tape RR5-1SD PAL. · PLAY-PAUSE mode · Short between TP11/SV-93C(B-3) and E1/SV-93C(A-6) with a shorting clip. · Short between TP3/SY-106(E-6) and E1/SY-106(H-6) with a shorting clip. · Release the PAUSE mode. · Adjust RV102 so as to meet the specification. · After the adjustment is completed, remove the shorting clips.	TP4/SV-93C(L-4) TP9/SV-93C(L-3)  T = 0 ± 1 msec (Take reading at the center of jitter.)	◉RV102/SV-93C(H-6) TRIG: TP9/SV-93C(L-3)

9-11. DRUM LOCK PHASE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· VIDEO IN connector: color-bar · INPUT SELECT SW: LINE · Insert the KSP-60 tape. · Short between TP8(L-6), TP5(M-6) and E3(N-6)/SV-93C with shortig clips. · REC mode · After the adjustment is completed, remove the shorting clips.	TP12/SV-93C(C-6) TP1/SV-93C(N-4)  A = 2.25 ± 0.2 H · Change to the trigger(−) side of oscilloscope, and then confirm to meet the specification.	◉RV402/SV-93C(N-5) TRIG: TP1/SV-93C(N-4)

9－12. SWITCHING POSITION ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
Step 1. · Short between TP5/SV-93C(L-2), TP8/SV-93C(K-2) and GND with shorting clips. · Play back the color-bar segment of the alignment tape RR5-1SD PAL. · Adjust the TRACKING volume so that the RF output wave can be maximum. Step 2. · Change the trigger of oscillo-scope to (+) and (−). · After the adjustment is completed, remove the shorting clips.	TP1/SV-93C(N-4) TP12/SV-93C(C-6)  A = 2.25 ± 0.2 H	CH-A : ●RV405/SV-93C(J-6) CH-B : ●RV404/SV-93C(M-4) TRIG: TP1/SV-93C(N-4)

SECTION 10
AUDIO SYSTEM ALIGNMENT

[Equipment Required]

- Dual Trace Oscilloscope
- Frequency Counter
- Audio Oscillator
- AC Voltmeter
- Audio Attenuator
- Blank Tape: KCA, KCS and KSP (When adjusting, use KCA and KCS unless otherwise specifically indicated.)
- Alignment Tape: RR5-1SD PAL (Part No.8-960-036-80) – SP tape –

TIME	VIDEO	AUDIO	TIME CODE
5	Color bars	———	———
3	Gated sweep (B/W)	1 kHz, 0 dB	———
3	Gated sweep (color)	10 kHz, −10 dB	———
3	Pulse & bar (MOD 10T and inverted 2T)	1 kHz, −20 dB (NR: OFF) 40 Hz, −20 dB (NR: OFF) 7 kHz, −20 dB (NR: OFF) 10 kHz, −20 dB (NR: OFF) 15 kHz, −20 dB (NR: OFF)	———
3	Monoscope (color)	1 kHz, −20 dB (NR: ON) 15 kHz, −20 dB (NR: ON)	———
3	Pseudo color bars	———	TIME CODE

10-1. EE LEVEL ADJUSTMENT

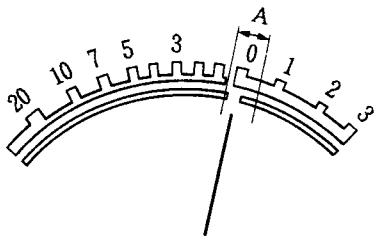
machine conditions for adjustment	specifications	adjustments
· LIMITER SW: OFF · AUDIO LINE IN CH-1,CH-2: 1kHz, +4dBm · EE mode · Connect the AC volt meter to TP13 /AU-89(A-1) and E11/AU-89(D-1).	· CH-1: TP13/AU-89(A-1) · CH-2: TP113/AU-89(E-1) −10.0 ± 0.2 dBs	· CH-1 AUDIO LEVEL control · CH-2 AUDIO LEVEL control

NOTE: This position should not be moved till the Audio System Alignment is completed.

10-2. EE LINE OUT LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· AUDIO LIMITER SW: OFF · AUDIO LINE IN CH-1,CH-2: 1kHz, +4dBm	CH-1 LINE OUT connector (terminated by 600Ω) CH-2 LINE OUT connector (terminated by 600Ω) 4.0 ± 0.3 dBm	CH-1: ●RV11/AU-89(A-1) CH-2: ●RV111/AU-89(B-1)

10-3. AUDIO LEVEL METER ADJUSTMENT

machine conditions for adjustment	Specifications	Adjustments
· AUDIO LIMITER SW: OFF · AUDIO LINE IN CH-1,CH-2: 1kHz, +4dBm	AUDIO LEVEL meter  A = 0 ± 0.5 dBs	CH-1: ●RV51/AU-82(C-4) CH-2: ●RV251/AU-82(C-4)

10-4. LIMITER LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· MIC IN CH-1,CH-2: 1kHz, −30dB · EE mode · AUDIO LIMITER SW: ON	CH-1 LINE OUT connector (terminated by 600Ω) CH-2 LINE OUT connector (terminated by 600Ω) 7.0 ± 0.3 dBm	CH-1: ●RV1/AU-82(C-1) CH-2: ●RV201/AU-82(D-1)

10-5. ALIGNMENT TAPE PB FREQUENCY RESPONSE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the audio frequency response check segment of the alignment tape RR5-1SD PAL.	CH-1 LINE OUT connector (terminated by 600Ω) CH-2 LINE OUT connector (terminated by 600Ω)	CH-1: · 7kHz Level ●RV101/AU-82(J-4) · 15kHz Level ●RV102/AU-82(J-2) CH-2: · 7kHz Level ●RV302/AU-82(H-4) · 15kHz Level ●RV303/AU-82(H-1)

Frequency	Level
40 Hz	0 ±3 dB
1 kHz	0 dB(REF)
7 kHz	0 ±0.5 dB
10 kHz	$0\ ^{+0.4}_{-0.6}$ dB
15 kHz	$0\ ^{+0.4}_{-1.0}$ dB

10-6. ALIGNMENT TAPE PB LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the audio 1kHz segment of the alignment tape RR5-1SD PAL.	CH-1: TP13/AU-89(A-1) CH-2: TP113/AU-89(E-1) −10.0 ± 0.2 dBs	CH-1: ●RV103/AU-82(J-2) CH-2: ●RV304/AU-82(J-1)

10-7. ALIGNMENT TAPE PB LINE OUT LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the audio 1kHz segment of the alignment tape RR5-1SD PAL.	CH-1 LINE OUT connector (terminated by 600Ω) CH-2 LINE OUT connector (terminated by 600Ω) 4.0 ± 0.3 dBm	CH-1: ⊘RV11/AU-89(A-1) CH-2: ⊘RV111/AU-89(B-1)

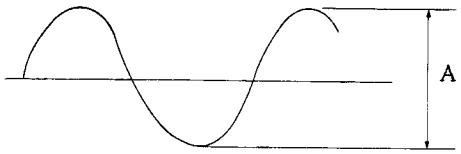
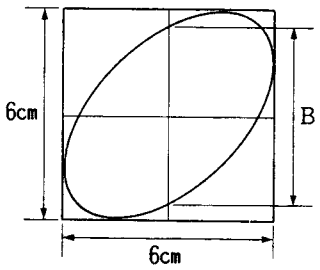
10-8. PB DOLBY DC BALANCE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
	CH-1: TP314/AU-89(M-1) TP315/AU-89(N-1) CH-2: TP316/AU-89(M-1) TP317/AU-89(M-1) DC voltage difference = 0 ± 0.1 Vdc	⊘RV315/AU-89(N-1) ⊘RV316/AU-89(M-1) TRIG: INT

10-9. PB DOLBY DETECT LEVEL ADJUSTMENT

machine conditions for adjustment	Specifications	Adjustments
	TP318/AU-89(K-1) E211/AU-89(L-1) DC voltage = 3.5 ± 0.05 Vdc	⊘RV317/AU-89(K-1)

10-10. PB PILOT TONE PHASE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
・Play back the frequency response check segment (NR:ON) of the alignment tape RR5-1SD PAL.	TP312/AU-89(K-1) TP313/AU-89(L-1)  $A = 0.5^{+0.1}_{-0}$ Vp-p	●RV313/AU-89(K-1) ●RV314/AU-89(M-1)
・Connect CH-1 of oscilloscope to TP-311/AU-89(L-1), and CH-2 of oscilloscope to TP312/AU-89(K-1) to be displayed Lissajous' wave. Adjust the X and Y axes' amplitude. ・Connect the oscilloscope to TP311 /AU-89(L-1) and TP313/AU-89(L-1), and then perform the same adjustment.	 B = less than 1.5cm	●RV312/AU-89(L-1)

10-11. PB FREQUENCY RESPONSE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
・Play back the audio 1kHz segment of the alignment tape, and then read the line out value(A). ・Short between TP212/AU-89(C-1) and TP501/AU-89(F-6) with a 10kΩ shorting clip. ・Play back the frequency response check segment (NR:ON) of the alignment tape RR5-1SD PAL. ・After the adjustment is completed, remove the shorting clip.	CH-1 LINE OUT connector (terminated by 600Ω) CH-2 LINE OUT connector (terminated by 600Ω)	

Frequency	Level
1 kHz	A −20±1.5 dB
15 kHz	$A - 20^{+2.2}_{-2.8}$ dB

10-12. FULL ERASE OSC. FREQUENCY/LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· MIC IN connector: terminated by 600Ω · Insert the KSP-60 tape. · REC mode · Solder C613 on SLIT/AU-82(A-3,4) and then read the frequency at this time. · Calculate the difference between this frequency and the specification, and then solder C610 to C613. Adjust so as to meet the specification.	TP601/AU-82(A-5) GND: E601/AU-82(A-5) Frequency: 71 ± 2 kHz Level: 300 ± 10 mVrms	⊘RV604/AU-82(A-1)

10-13. AUDIO ERASE OSC. FREQUENCY ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· MIC IN connector: terminated by 600Ω · Insert the KSP-60 tape. · REC mode	TP602/AU-82(B-5) E601/AU-82(A-1) Frequency: 71 ± 0.2 kHz Level: 230 ± 30 mVrms	⊘LV601/AU-82(B-4)

10-14. REC BIAS VOLTAGE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· MIC IN connector: terminated by 600Ω · Insert the KSP-60 tape. · REC mode	CH-1: TP101/AU-82(J-5) GND: TP102/AU-82(J-5) CH-2: TP301/AU-82(H-5) GND: TP302/AU-82(H-5) 11.0 ± 0.5 mVrms	CH-1: ⊘RV601/AU-82(B-4) CH-2: ⊘RV602/AU-82(B-4)

10-15. BIAS TRAP ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· LINE IN connector: terminated by 600Ω · Insert the KSP-60 tape. · REC mode	CH-1: TP152/AU-82(J-5) GND: E151/AU-82(H-6) CH-2: TP352/AU-82(H-5) GND: E151/AU-82(H-6) Minimize the level. (less than −35 dBs)	CH-1: ●LV151/AU-82(J-5) CH-2: ●LV351/AU-82(H-5) · Adjust from the component side.

10-16. REC LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· AUDIO LINE IN CH-1,CH-2: 1kHz, −16dBm · REC mode · Short between TP603/AU-82(B-2) and E601/AU-82(A-5) with a shorting clip. · After the adjustment is completed, remove the shorting clip.	CH-1: TP152/AU-82(J-5) GND: E151/AU-82(H-6) CH-2: TP352/AU-82(H-5) GND: E151/AU-82(H-6) −16 ± 1 dBs	CH-1: ●RV152/AU-82(K-2) CH-2: ●RV352/AU-82(G-2)

10-17. DUB DUMMY COIL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· MIC IN connector: terminated by 600Ω · Insert the KSP-60 tape. · REC mode (This frequency is A.) · DUB mode	TP602/AU-82(A-5) E601/AU-82(A-5) DUB Frequency: A ± 0.2 kHz DUB Level: 230 ± 30 mVms	●LV602/AU-82(A-4)

10-18. CROSSTALK CANCELLER ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· LINE IN CH-1,CH-2: 5kHz, +4dBm · Insert the KSP-60 tape which has almost erased audio signal. · DUB mode	CH-1 LINE OUT connector (terminated by 600Ω) +4dBm CH-2 LINE OUT connector (terminated by 600Ω) Minimize the level. (less than −18 dBm)	⊘RV301/AU-82(K-4)

10-19. DUB BIAS TRAP ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· MIC IN connector: terminated by 600Ω · Insert the KSP-60 (no signal) tape. · DUB mode	TP303/AU-82(G-3) E151/AU-82(H-6) Minimize the level. (less than −18 dBs)	⊘LV301/AU-82(H-5) (Adjust from the component side.)

10-20. CH-1 REC EQ ADJUSTMENT (SP TAPE)

machine conditions for adjustment	specifications	adjustments
Step 1. · AUDIO LINE IN CH-1,CH-2: 1kHz, −16dBm · Short between TP603/AU-82(B-2) and E601/AU-82(A-5) with a shorting clip. · Turn RV151/AU-82(K-3) fully clockwise. · Insert the KSP-60 tape. · REC mode · Read the indication of the AC volt meter as A.	TP152/AU-82(J-5)	
Step 2. · Change the OSC frequency to 1kHz→21kHz. · After the adjustment is completed, remove the shorting clip.	TP152/AU-82(J-5) Maximize the level. (A + 21 ± 0.5 dB)	⊘LV152/AU-82(K-3) (Adjust from the component side.) ⊘RV151/AU-82(K-3)

10-21. CH-2 REC EQ ADJUSTMENT (SP TAPE)

machin conditions for adjustment	Specifications	Adjustments
Step 1. ・AUDIO LINE IN CH-1,CH-2: 1kHz, −16dBm ・Short between TP603/AU-82(B-2) and E601/AU-82(A-5) with a shorting clip. ・Turn RV352/AU-82(G-2) fully clockwise. ・Insert the KSP-60 tape. ・REC mode ・Read the indication of the AC volt meter as A.	TP352/AU-82(H-5)	
Step 2. ・Change the OSC frequency to 1kHz→21kHz. ・After the adjustment is completed, remove the shorting clip.	TP352/AU-82(H-5) Maximize the level. (A + 21 ± 0.5 dB)	⊘LV352/AU-89(G-2) (Adjust from the soldering side.) ⊘RV351/AU-82(G-2)

10-22. CH-1 OVERALL FREQUENCY RESPONSE ADJUSTMENT (SP TAPE)

<table>
<tr>
<th>machine conditions for adjustment</th>
<th>specifications</th>
<th>adjustments</th>
</tr>
<tr>
<td>
・AUDIO LINE IN: 40Hz,90Hz,1kHz,
3kHz,7kHz,10kHz,15kHz,−16dB
・DOLBY SW: OFF
・Insert the KSP-60 tape.
・Record each frequency for 15 seconds.
・Rewind and Play back the recorded portion.
</td>
<td>
CH-1 LINE OUT connector (terminated by 600Ω)
<table>
<tr><th>Frequency</th><th>Level</th></tr>
<tr><td>40 Hz</td><td>0 ± 3 dB</td></tr>
<tr><td>90 Hz</td><td>0 ± 2 dB</td></tr>
<tr><td>1 kHz</td><td>0 dB (REF)</td></tr>
<tr><td>3 kHz</td><td>0 ±0.7 dB</td></tr>
<tr><td>7 kHz</td><td>0 ±0.7 dB</td></tr>
<tr><td>10 kHz</td><td>$0\ ^{+0.6}_{-0.8}$ dB</td></tr>
<tr><td>15 kHz</td><td>$0\ ^{+0.4}_{-1.0}$ dB</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td></td>
<td>
When 7～15 kHz doesn't meet the specification:
1. CH-1, CH-2 MIC IN connector:
terminated by 600Ω
2. Connect the AC volt meter to TP101/AU-82(J-5)
(GND: TP102/AU-82(J-5)).
3. Insert the KSP-60 tape.
4. REC mode
5. Readjust the bias at RV601/AU-82(B-4).
bias voltage: 8～15mVrms
NOTE: When the high frequency is lower than the specification, lower the bias voltage.
6. REC/PB and then confirm that the frequency response meets the specification.

When 15kHz doesn't meet the specification:
1. Short between TP603/AU-82(B-2) and E601/AU-82
(A-5) with a shorting clip.
2. Connect the AC volt meter to TP152/AU-82(J-2).
3. LINE IN CH-1 connector: 15kHz, −16dBm
4. Insert the KSP-60 tape.
5. REC mode. Read the indication of the AC volt meter(A).
6. Add to A for the level which doesn't meet the specification of 15kHz.
7. Readjust the value of the Step 5 at RV151/AU-82
(K-3).
8. REC/PB and confirm that the frequency response meets the specification.
</td>
<td></td>
</tr>
</table>

10-23. CH-2 OVERALL FREQUENCY RESPONSE ADJUSTMENT (SP TAPE)

<table>
<tr><th>machine conditions for adjustment</th><th>specifications</th><th>adjustments</th></tr>
<tr><td>
・AUDIO LINE IN: 40Hz, 90Hz, 1kHz, 3kHz, 7kHz, 10kHz, 15kHz, −16dB
・DOLBY SW: OFF
・Insert the KSP-60 tape.
・Record each frequency for 15 seconds.
・Rewind and Play back the recorded portion.
</td><td>
CH-2 LINE OUT connector (terminated by 600Ω)
<table>
<tr><th>Frequency</th><th>Level</th></tr>
<tr><td>40 Hz</td><td>0 ± 3 dB</td></tr>
<tr><td>90 Hz</td><td>0 ± 2 dB</td></tr>
<tr><td>1 kHz</td><td>0 dB (REF)</td></tr>
<tr><td>3 kHz</td><td>0 ±0.7 dB</td></tr>
<tr><td>7 kHz</td><td>0 ±0.7 dB</td></tr>
<tr><td>10 kHz</td><td>$0\ ^{+0.6}_{-0.8}$ dB</td></tr>
<tr><td>15 kHz</td><td>$0\ ^{+0.4}_{-1.0}$ dB</td></tr>
</table>
</td><td></td></tr>
<tr><td></td><td>
When 7∼15 kHz doesn't meet the specification:
1. CH-1, CH-2 MIC IN connector: terminated by 600Ω
2. Connect the AC volt meter to TP301/AU-82(H-5) (GND: TP302/AU-82(H-5)).
3. Insert the KSP-60 tape.
4. REC mode
5. Readjust the bias at RV602/AU-82(B-4). bias voltage: 8∼15mVrms
NOTE: When the high frequency is lower than the specification, lower the bias voltage.
6. REC/PB and then confirm that the frequency response meets the specification.

When 15kHz doesn't meet the specification:
1. Short between TP603/AU-82(B-2) and E601/AU-82 (A-5) with a shorting clip.
2. Connect the AC volt meter to TP352/AU-82(H-2).
3. LINE IN CH-1 connector: 15kHz, −16dBm
4. Insert the KSP-60 tape.
5. REC mode. Read the indication of the AC volt meter(A).
6. Add to A for the level which doesn't meet the specification of 15kHz.
7. Readjust the value of the Step 5 at RV352/AU-82 (G-2).
8. REC/PB and confirm that the frequency response meets the specification.
</td><td></td></tr>
</table>

10-24. DUB OVERALL FREQUENCY RESPONSE ADJUSTMENT (SP TAPE)

machine conditions for adjustment	specifications	adjustments
· AUDIO LINE IN: 40Hz, 90Hz, 1kHz, 3kHz, 7kHz, 10kHz, 15kHz, −16dB · DOLBY SW: OFF · Insert the KSP-60 tape. · Set each frequency to DUB mode for 15 seconds. · Rewind and Play back the recorded portion.	CH-1 LINE OUT connector	

Frequency	Level
40 Hz	0 ± 3 dB
90 Hz	0 ± 2 dB
1 kHz	0 dB (REF)
3 kHz	0 ±0.7 dB
7 kHz	0 ±0.7 dB
10 kHz	$0\ ^{+0.6}_{-0.8}$ dB
15 kHz	$0\ ^{+0.4}_{-1.0}$ dB

NOTE: When not to meet the specification, perform Sec. 10-17 DUB DUMMY COIL ADJUSTMENT.

10-25. CONVENTIONAL TAPE REC BIAS VOLTAGE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· MIC IN CH-1, CH-2 connector: terminated by 600Ω · Insert the KCA-60 tape. · REC mode	TP101/AU-82(J-5) GND: TP102/AU-82(J-5) 9.0 ± 0.5 mVrms	⊘RV603/AU-82(A-1)

10-26. CONVENTIONAL TAPE OVERALL FREQUENCY RESPONSE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· LINE IN CH-1, CH-2 connector: terminated by 600Ω · Insert the KCA-60 tape. · REC mode.	CH-1,CH-2 LINE OUT connector: (terminated by 600Ω)	

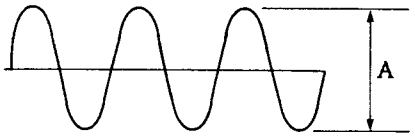
Frequency	Level
40 Hz	$0\ ^{+3}_{-4}$ dB
90 Hz	0 ± 2 dB
1 kHz	0 dB(REF)
3 kHz	0 ±1.5 dB
7 kHz	0 ±1.5 dB
10 kHz	$0\ ^{+1.4}_{-1.6}$ dB
15 kHz	$0\ ^{+1.7}_{-2.3}$ dB

NOTE: When not to meet the specification, perform Sec. 10-14 REC BIAS VOLTAGE ADJUSTMENT.
When the high frequency is lower than the specification, lower the bias voltage.

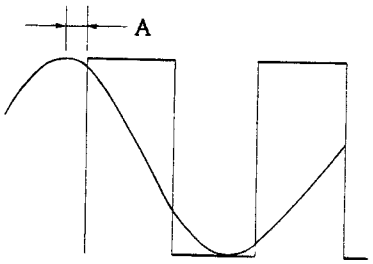
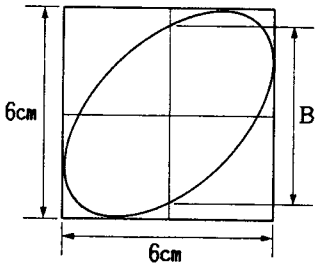
10-27. SP TAPE REC PB LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· LINE IN CH-1, CH-2 connector: 1kHz, 4dBm	TP13/AU-89(A-1) TP113/AU-89(E-1)	CH-1: ⊘RV152/AU-82(K-2)
· Insert the KSP-60 tape.	−10 ± 0.3 dBs	CH-2: ⊘RV352/AU-82(H-5)
· REC mode	Confirm the LINE OUT CH-1, CH-2 level. 4.0 ± 0.3 dBm	

10-28. OA PILOT TONE LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· LINE IN CH-1, CH-2 connector: terminated by 600Ω · DOLBY SW: ON · Insert the KSP-60 tape. · REC mode	TP152/AU-82(J-5) TP352/AU-82(H-5) Adjust to −22 ± 1 dBs temporarily.	CH-1: ●RV211/AU-89(E-1) CH-2: ●RV212/AU-89(F-1)
	CH-1: TP312/AU-89(K-1) CH-2: TP313/AU-89(L-1)  Perform the fine tuning so as to be A = 0.6 ± 0.05 Vp-p.	CH-1: ●RV211/AU-89(E-1) CH-2: ●RV212/AU-89(F-1)

10-29. OA PILOT TONE PHASE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· LINE IN CH-1, CH-2 connector: terminated by 600Ω · DOLBY SW: ON · Insert the KSP-60 tape. · REC mode	CH-1: TP311/AU-89(L-1) CH-2: TP211/AU-89(H-1)  Adjust A = 0 ± 2.7 msec temporarily.	⊘RV311/AU-89(L-1)
· Play back the REC portion.	CH-1: TP311/AU-89(L-1) CH-2: TP312/AU-89(K-1)  Perform the fine tuning so as to be B ≦ 1.5 cm.	⊘RV311/AU-89(L-1) TRIG: TP311/AU-89(L-1)

SECTION 11
VIDEO SYSTEM ALIGNMENT

The sec 9. SERVO SYSTEM ALIGNMENT should be completed before initiating this Alignment.

[Equipment Required]

- Dual Trace Oscilloscope
- Frequency Counter
- Video Signal Generator
- Video Sweep Generator
- DC Voltmeter
- Vectorscope
- Blank Tape: KCA, KCS and KSP
- Alignment Tape: RR5-1SD PAL (Part No.8-960-036-80) −SP tape−

TIME	VIDEO	AUDIO	TIME CODE
5	Color bars	———	———
3	Gated sweep (B/W)	1 kHz, 0 dB	———
3	Gated sweep (color)	10 kHz, −10 dB	———
3	Pulse & bar (MOD 10T and inverted 2T)	1 kHz, −20 dB (NR: OFF) 40 Hz, −20 dB (NR: OFF) 7 kHz, −20 dB (NR: OFF) 10 kHz, −20 dB (NR: OFF) 15 kHz, −20 dB (NR: OFF)	———
3	Monoscope (color)	1 kHz, −20 dB (NR: ON) 15 kHz, −20 dB (NR: ON)	———
3	Pseudo color bars	———	TIME CODE

- Alignment Tape: RR5-2SB PAL (Part No.8-960-020-62) −conventional tape−

TIME	VIDEO	AUDIO	TIME CODE
5	Color bars	3 kHz, 0 dB	1 kHz
5	R-F sweep	———	———
5	Monoscope	———	———
2.5	Modulated 20T pulse	1 kHz, 0 dB	———
2.5	R-F 8 MHz	10 kHz, −10 dB	———

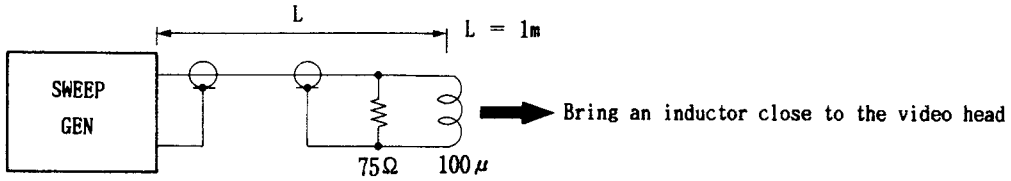
- Alignment Tape: RR5-2SC PAL (Part No.8-960-035-61)

Real Time Counter (min.)	Tape Counter	Video track	Audio track
00 : 00 − 04 : 00	000 − 100	Monoscope	3 kHz, 0 dB
04 : 00 − 09 : 00	100 − 208	Color-bar	———
09 : 00 − 14 : 00	208 − 300	R-F sweep	———
14 : 00 − 16 : 00	300 − 335	Mod. 20T pulse	1 kHz, 0 dB
16 : 00 − 18 : 00	335 − 367	M.S. w/burst	10 kHz, −10 dB
18 : 00 − 20 : 00	367 − 398	Pseudo C.B. for DOC adj.	———

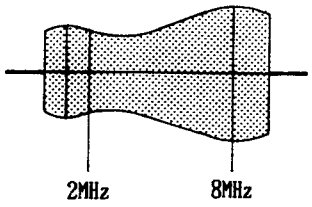
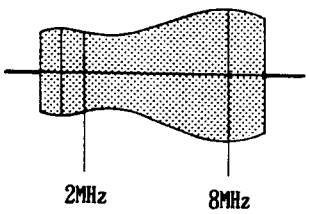
11-1. PB RF ADJUSTMENT

11-1-1. PB Pre-Amplifier Frequency Adjustment

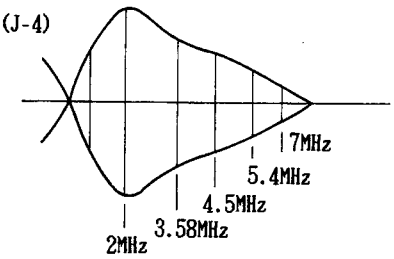
To make this adjustment, stop the rotation of the head drum without cassette tape and to L-couple sweep signal with the video head using an inductor (approx. 100μH).



Sweep signal band width: 1 to 10 MHz

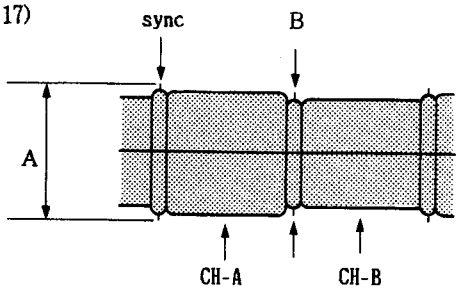
machine conditions for adjustment	specifications	adjustments
Step 1. CH-A frequency adjustment · POWER ON. · Couple a sweep signal with the video head (CH-A). · Adjust coupling so that the amplitude is maximized. · After the adjustment is completed, remove the shorting clip.	TP7/RP-35(B-6)  2 MHz: 100 % 8 MHz: 135±5 %	⊘RV4/RP-35(C-6) TRIG: TRIG OUT of SWEEP GEN
Step 2. CH-B frequency adjustment · POWER ON. · Couple a sweep signal with the video head (CH-B). · Adjust coupling so that the amplitude is maximized. · After the adjustment is completed, remove the shorting clip.	TP10/RP-35(B-6)  2 MHz: 100 % 8 MHz: 135±5 %	⊘RV6/RP-35(A-6) TRIG: TRIG OUT of SWEEP GEN

11-1-2. PB RF Frequency Response Adjustment (Middle)

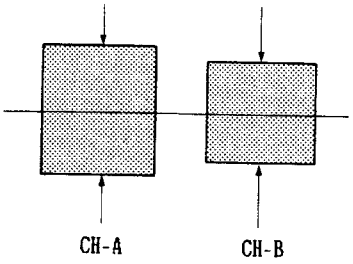
machine conditions for adjustment	specifications	adjustments
· Short between TP8/SV-93C(L-6) and GND with a shorting clip. · Play back the RF sweep segment of the alignment tape RR5-2SB PAL. · Adjust the TRAKING control so that the RF level at TP103/VO-17(J-4) is maximized. · After the adjustment is completed, remove the shorting clip.	TP103/VO-17(J-4)  Adjust 7MHz level so as to meet the specification. Confirm other frequency so as to meet the specification. When not to meet the specification fine adjust RV40(CH-A) or RV41(CH-B).	CH-A: ●RV40/VO-17(J-7) CH-B: ●RV41/VO-17(J-7)

Frequency	Level
2 MHz	100%(REF)
3.58 MHz	102±12%
4.5 MHz	108±13%
5.4 MHz	96±15%
7 MHz	65± 5 %

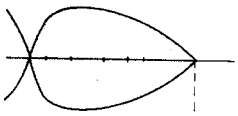
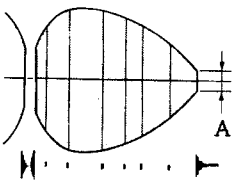
11-1-3. PB Y RF Channel Balance/Level Adjustment

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL. · Adjust the TRACKING control so that the RF level at TP104/VO-17 is maximized.	TP104/VO-17(F-6) (E3/VO-17)  Balance : A = B Level : A = B = 0.3 ± 0.02 Vp-p	Balance: ●RV39/VO-17(J-6) Level: ●RV38/VO-17(J-6) TRIG: TP16/CO-7(H-6)

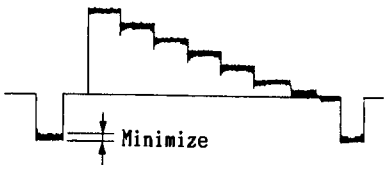
11-1-4. PB Chroma RF Channel Balance/Level Adjustment

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL. · Adjust the TRACKING control so that the RF level at TP7/CO-7(H-6) is maximized.	TP7/CO-7 (H-6)  Balance : CH-A Level = CH-B Level Level : 0.2 ± 0.01 Vp-p	Balance: ⊘RV36/VO-17(J-4) Level: ⊘RV37/VO-17(J-4) TRIG: TP16/CO-7(H-6)

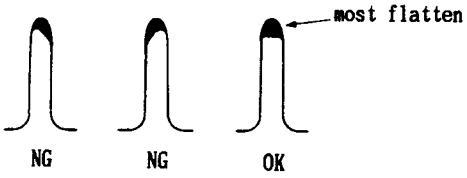
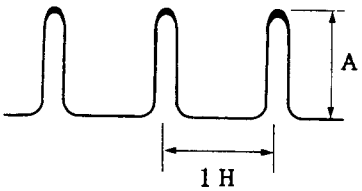
11-2. DROPOUT COMPENSATOR SENSITIVITY ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the RF sweep segment of the alignment tape RR5-2SB PAL. · TRACKING volume: FIXED · Short between TP8/SV-93C(L-6) and E3/SV-93C(N-6) with a shorting clip. · After the adjustment is completed, remove the shorting clip.	CH-1: TP104/VO-17(F-6)  CH-2: TP105/VO-17(E-6) oscilloscope: ADD mode  A = 30 ± 4 mVp-p	⊘RV35/VO-17(H-7) TRIG: EXT TP16/CO-7(H-6)

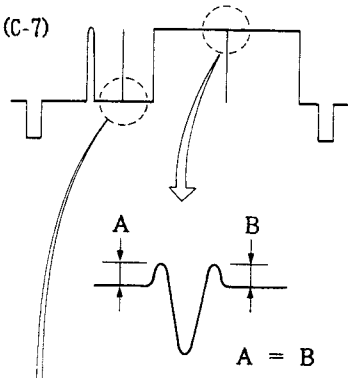
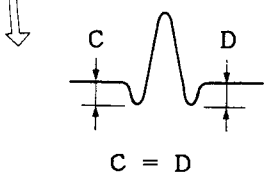
11-3. CARRIER BALANCE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-2SC PAL.	TP106/VO-17(A-5) (E1/VO-17)  	⊘RV24/VO-17(F-7) TRIG: TP16/CO-7(H-6)

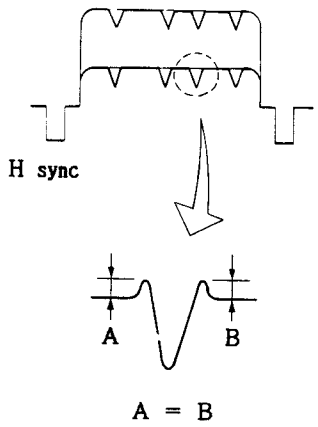
11-4. SP MODE DETECTOR CIRCUIT ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
Step 1. · Disconnect the shorting socket CP-1/VO-17(G-7). · Play back the color-bar segment of the alignment tape RR5-2SB PAL.	TP18/VO-17(G-6)  	⊘LV1/VO-17(G-6)
Step 2. · After the adjustment is completed, connect the shorting socket.	TP18/VO-17(G-6)  A = 2.3 ± 0.1 Vp-p Confirm that SP/HIGH lamp on the front panel is turned ON.	⊘RV106/VO-17(G-7) TRIG: TP9/CO-7(G-7)

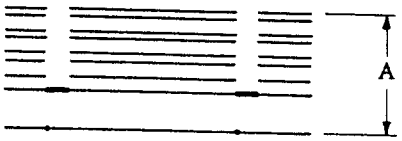
11-5. PB Y PHASE EQUALIZE RRE-ADJUSTMENT (SP and High modes)

machine conditions for adjustment	specifications	adjustments
Step 1. · Turn S1/V0-17(F-2) to ON. · Play back the pulse & bar segment of the alignment tape RR5-1SD PAL.	TP8/V0-17(C-7)  	⊘RV3/V0-17(A-3)
Step 2. · Play back the pulse & bar segment of the alignment tape RR5-2SB PAL. · After this adjustment, turn S1 to OFF.	 	⊘RV2/V0-17(B-3) TRIG: TP9/C0-7(G-6)

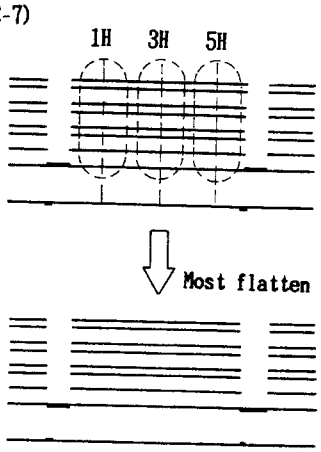
11-6. PB Y PHASE EQUALIZE RRE-ADJUSTMENT (Low mode)

machine conditions for adjustment	specifications	adjustments
· Play back the monoscope segment of the alignment tape RR5-2SC PAL.	TP106/V0-17(B-5)  	⊘RV107/V0-17(A-3) TRIG: TP9/C0-7(G-6)

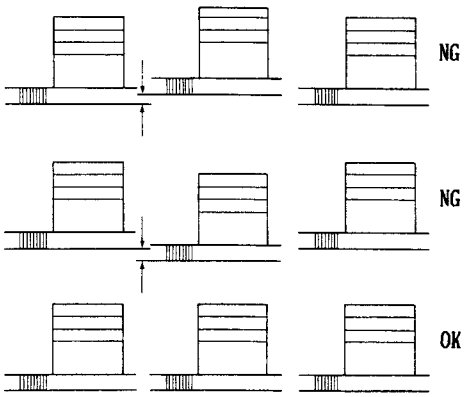
11-7. DUB Y OUTPUT LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP11/VO-17(F-8)  A = 1.7 ± 0.2 Vp-p	⊘RV4/VO-17(A-5) TRIG: TP16/CO-7(H-6)

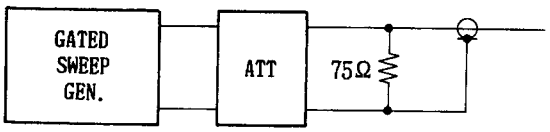
11-8. DROPOUT COMPENSATOR CIRCUIT DC BALANCE ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the Pseudo CB for DOC adjustment segment of the alignment tape RR5-1SD PAL.	TP10/VO-17(E-7)  Adjust RV21 and RV105 so that the waveform at 5H portion is flatten.	Level: ⊘RV21/VO-17(C-6) DC Bias: ⊘RV105/VO-17(D-5) TRIG: TP16/CO-7(H-6)

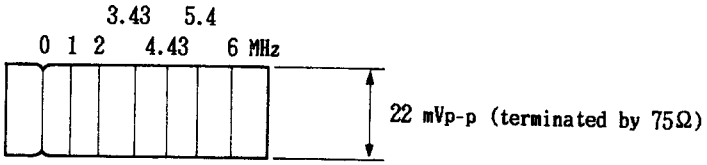
11-9. SP/CONVENTIONAL EDITING POINT DC ADJUSTMENT

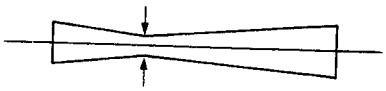
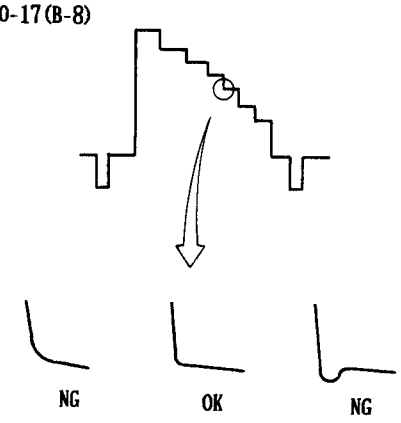
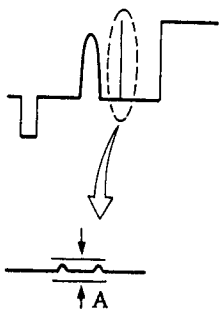
machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar (B/W mode) · Insert the KSP-60 tape. · Turn S1/VO-17(F-2) to ON. · Produce the SP/Conventional editing tape as following procedure and play back it. ① REC mode ② PAUSE mode ③ Short between TP17/VO-17(G-5) and E7/VO-17(G-5) with a shorting clip. ④ PAUSE mode: OFF ⑤ Remove the shorting clip. ⑥ Repeat the steps ① to ⑤ 10 to 20 times. · Disconnect the shorting socket CP1/VO-17(G-7). · After the adjustment is completed, connect the shorting socket.	TP106/VO-17(B-5)  Adjust RV6/VO-17(B-4) so that no dc change appears at the editing points.	⊘RV6/VO-17(B-4) TRIG: TP16/CO-7(H-6)

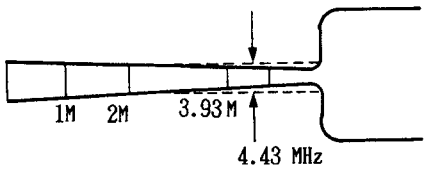
11-10. Y NOISE CANCELLER ADJUSTMENT

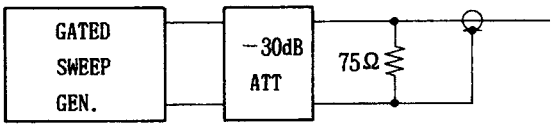


SWEEP SIGNAL LEVEL at TP10



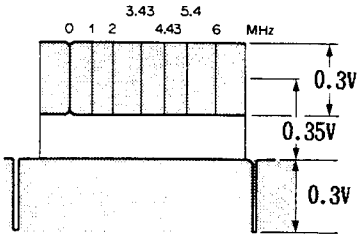
machine conditions for adjustment	specifications	adjustments
Step 1. · POWER SW: OFF · Desolder SL1/VO-17(D-6) on the soldering side. · Connect the sweep signal as shown in above. · Turn ON the POWER SW. · Fully turn RV22/VO-17(C-8) in the clockwise direction.	TP8/VO-17(C-7)  Minimize the amplitude of the cross point (at 2MHz).	⊘RV23/VO-17(C-7)
Step 2. · Solder SL1/VO-17(D-6). · Play back the color-bar sagment of the alignment tape RR5-1SD PAL.	TP109/VO-17(B-8)  NG OK NG	⊘RV23/VO-17(C-7)
Step 3. · Play back the pulse & bar segment of the alignment tape RR5-1SD PAL.	TP111/VO-17(A-7)  A Minimize the A level.	⊘RV108/VO-17(A-8)

Step 4. · POWER SW: OFF · Desolder SL1/VO-17(D-6). · Connect the gated sweep signal as shown in below. · Turn ON the POWER SW. · EE mode · After this adjustment is completed, solder SL1/VO-17.	TP4/VO-17(A-7)  Minimize the amplitude of the cross point (at around 4MHz).	⊘RV109/VO-17(B-7)

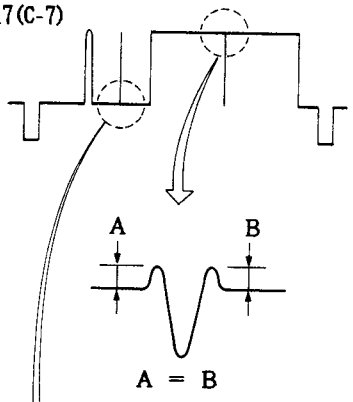
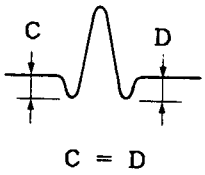


TP10/VO-17(D-7)
GND; E3/VO-17(F-7)
(−36dB: when the signal is connected to TP10.)

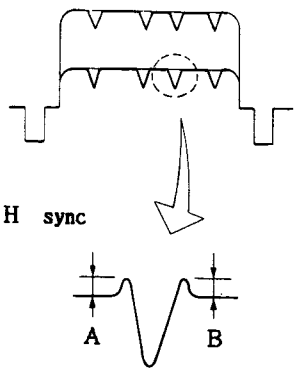
SWEEP GENERATOR SIGNAL LEVEL



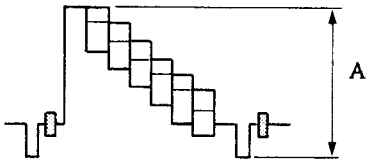
11-11. PB Y PHASE EQUALIZER ADJUSTMENT (SP and High modes)

machine conditions for adjustment	specifications	adjustments
Step 1. · Turn S1/V0-17(F-2) to ON. · Play back the pulse & bar segment of the alignment tape RR5-1SD PAL.	TP8/V0-17(C-7)  	⊘RV3/V0-17(A-3)
Step 2. · Play back the pulse & bar segment of the alignment tape RR5-2SB PAL. · After the adjustment is completed, turn S1 to OFF.	 	⊘RV2/V0-17(B-3) TRIG: TP9/C0-7(G-6)

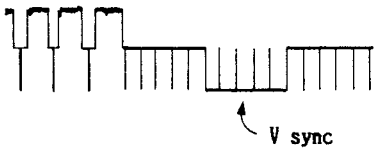
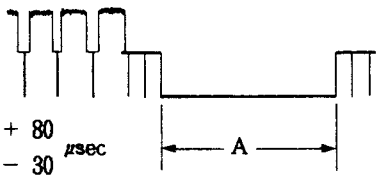
11-12. PB Y PHASE EQUALIZER ADJUSTMENT (Low mode)

machine conditions for adjustment	specifications	adjustments
· Play back the monoscope segment of the alignment tape RRS-ISC PAL if (B/W) S1 should be turned OFF.	TP8/V0-17(C-7)  	⊘RV107/V0-17(A-3) TRIG: TP9/C0-7(G-6)

11-13. Y OUTPUT LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL.	VIDEO OUT (terminated by 75Ω)  A = 1.0 ± 0.02 Vp-p	⊘RV20/VO-17(B-7) TRIG: TP9/CO-7(G-6)

11-14. FALSE VD PULSE WIDTH ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL. · PAUSE mode	TP4/VO-17(A-7) (PLAY mode)  (PAUSE mode)  A = 320 $^{+\ 80}_{-\ 30}$ μsec	⊘RV105/CO-7(E-6) TRIG: TP16/CO-7(H-6)

11-15. MODULATOR SYSTEM ADJUSTMENT

11-15-1. Sync Tip Carrier Frequency Adjustment (SP mode)

machine conditions for adjustment	specifications	adjustments
· Insert the KSP-60 tape. · REC MODE switch: SP/HIGH · EE mode · VIDEO IN: no signal	TP1/VO-17(A-2) 5.6 $^{+\ 0}_{-\ 0.05}$ MHz	⊘RV15/VO-17(D-5)

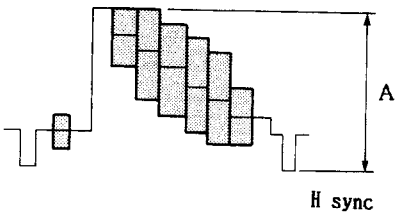
11-15-2. Sync Tip Carrier Frequency Adjustment (High-band mode)

machine conditions for adjustment	specifications	adjustments
· Insert the KCA-60 tape. · REC MODE switch: SP/HIGH · EE mode · VIDEO IN: no signal	TP1/VO-17(A-2) 4.8 ± 0.05 MHz	⊘RV16/VO-17(E-5)

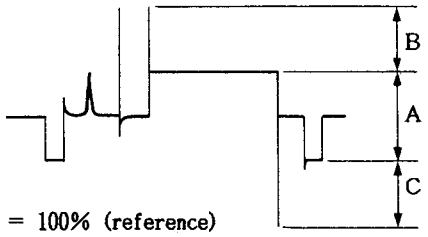
11-15-3. Sync Tip Carrier Frequency Adjustment (Low-band mode)

machine conditions for adjustment	specifications	adjustments
· Insert the KCA-60 tape. · REC MODE switch: LOW · EE mode · Turn S1/VO-17(F-2) to OFF. · VIDEO IN: no signal · After the adjustment is completed, set S1/VO-17 to ON.	TP1/VO-17(A-2) 3.8 ± 0.05 MHz	⊘RV17/VO-17(E-5)

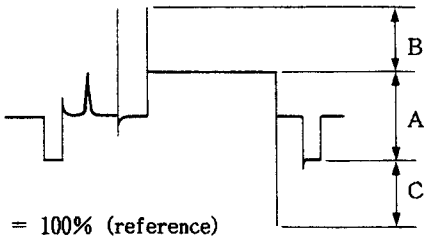
11-15-4. FM Deviation Adjustment

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar · Insert the KSP-60 tape. · REC MODE switch: SP/HIGH · Play back the self-recorded portion of the tape.	VIDEO OUT connector (terminated by 75Ω)  A = 1 ± 0.1 Vp-p Adjust in recording mode and check in play back mode.	⊘RV14/VO-17(D-3) TRIG: INT

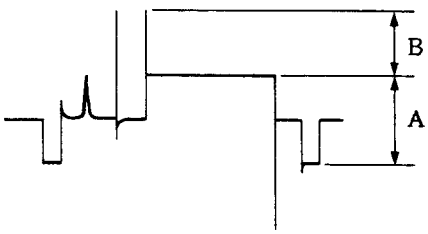
11-15-5. White/Dark Clip Adjustment (SP mode)

machine conditions for adjustment	specifications	adjustments
· Insert the KSP-60 tape. · REC MODE switch: SP/HIGH · EE mode · VIDEO IN: pulse & bar(with burst)	TP3/VO-17(C-4)  A = 100% (reference) B = 130 ± 5% C = 120 ± 5%	Spec B: ●RV9/VO-17(C-5) Spec C: ●RV11/VO-17(C-5) TRIG: TP9/CO-7(G-6)

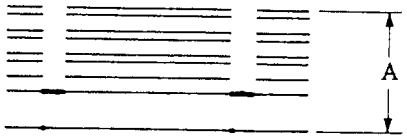
11-15-6. White/Dark Clip Adjustment (High-band mode)

machine conditions for adjustment	specifications	adjustments
· Insert the KCA-60 tape. · REC MODE switch: SP/HIGH · EE mode · VIDEO IN: pulse & bar(with burst)	TP3/VO-17(C-4)  A = 100% (reference) B = 120 $^{+0}_{-5}$ % C = 100 $^{+0}_{-5}$ %	Spec.B: ●RV103/VO-17(A-3) Spec.C: ●RV104/VO-17(A-3) TRIG: TP9/CO-7(G-6)

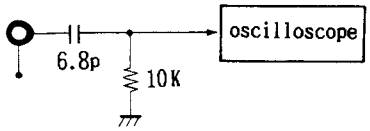
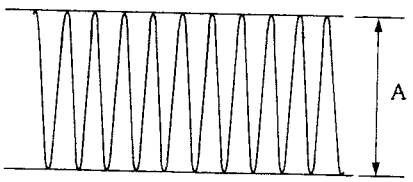
11-15-7. White/Dark Clip Adjustment (Low-band mode)

machine conditions for adjustment	specifications	adjustments
· Insert the KCA-60 tape. · REC MODE switch: LOW · EE mode · VIDEO IN: pulse & bar (with burst) · Turn S1/VO-17(F-2) to OFF. · After the adjustment is completed, set S1/VO-17 to ON.	TP3/VO-17(C-4)  A = 100%(reference) B = 55 $^{+0}_{-5}$ %	Spec B: ●RV10/VO-17(C-5) TP9/CO-7(G-6)

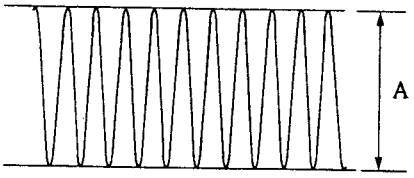
11-15-8. EE DUB Y Output Level Adjustment

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar · Insert the KCA-60 tape. · REC MODE switch: LOW · Turn S1/VO-17(F-2) to OFF. · EE mode · After the adjustment is completed, set S1/VO-17 to ON.	TP11/VO-17(E-8)  A = 1.7 ± 0.2 Vp-p	⊘RV25/VO-17(F-6) TRIG: TP16/CO-7(H-6)

11-15-9. REC HF Balance Adjustment(SP mode)

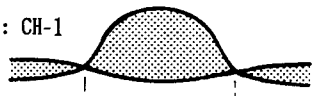
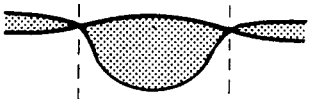
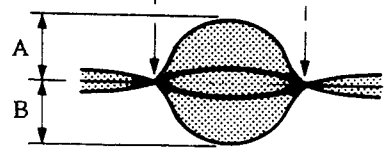
machine conditions for adjustment	specifications	adjustments
· VIDEO IN: no signal. · Insert the KSP-60 tape. · EE mode · Turn S1/VO-17(F-2) to ON. · Connect the high-pass filter to TP1. (Use 6.8pF capacitor and 10kΩ resistor) as shown below. TP1/VO-17(A-2)  · Detect the output of the high-pass filter by the oscilloscops.	TP1/VO-17(A-2)  Maximize the A level.	⊘RV8/VO-17(B-2) TRIG: INT

11-15-10. REC HF Balance Adjustment (Low mode)

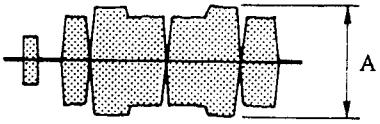
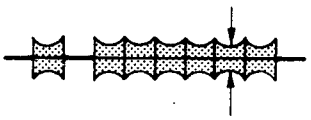
machine conditions for adjustment	specifications	adjustments
· VIDEO IN: no signal. · Insert the KCA-60 tape. · REC MODE switch: LOW · Turn S1/V0-17(F-2) to OFF. · EE mode · Connect the high-pass filter to TP1. (Use 6.8pF capacitor and 10kΩ resistor) as shown in above. · Detect the output of the high-pass filter by the oscilloscope.	TP1/V0-17(A-2)  Maximize the A level.	⊘RV110/V0-17(C-3) TRIG: INT

11-16. REC Y/C SEPARATOR ADJUSTMENT

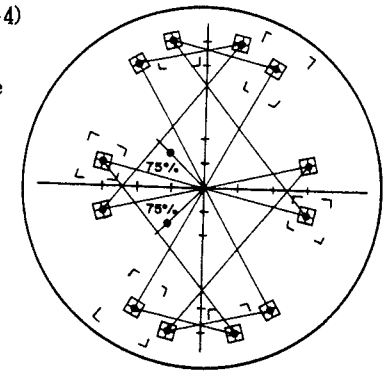
11-16-1. Chroma Correlator Balance Adjustment

machine conditions for adjustment	specifications	adjustments
· REC MODE switch: SP/HIGH · VIDEO IN: gated sweep · EE mode	TP107/V0-17(H-1): CH-1  TP107/V0-17(H-1) (Invert): CH-2  (CHOP mode)  A = B (Similarity figures upper waveform and lower waveform)	⊘RV28/V0-17(H-2) TRIG: TP16/C0-7(H-6)

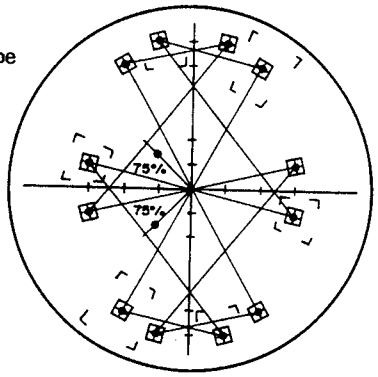
11-16-2. Process Level/Chroma Delay Adjustment

machine conditions for adjustment	specifications	adjustments
Step 1. · VIDEO IN: color-bar · EE mode · Adjust the level to identify each other.	CH-1: TP19/V0-17(H-2) CH-2: TP13/V0-17(G-3) } CHOP mode  Adjust the A level of CH-1 to A level of CH-2.	◉RV27/V0-17(H-3) TRIG: TP9/C0-7(G-6)
Step 2. · VIDEO IN: color-bar · EE mode · Change the mode of oscilloscope to ADD mode.	CH-1: TP19/V0-17(H-2) CH-2: TP13/V0-17(G-3)(Invert) } ADD mode  Minimize this level.	◉RV26/V0-17(G-2) (ADD mode) ◉RV27/V0-17(H-3) (CHOP mode) TRIG: TP9/C0-7(G-6)

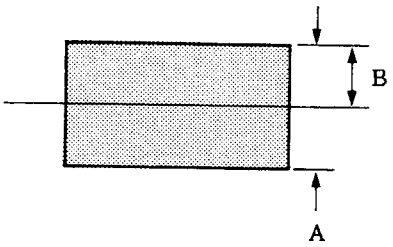
11-16-3. Slice Level Adjustment (1)

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar · EE mode · Before adjustment, adjust the phase control and gain control of vectorscope so that the burst spots are located at 75%-burst positions.	TP14/V0-17(G-4) Vectorscope  Each color spots should be ⊞-marked positions.	◉RV29/V0-17(G-3)

11-16-4. Slice Level Adjustment (2)

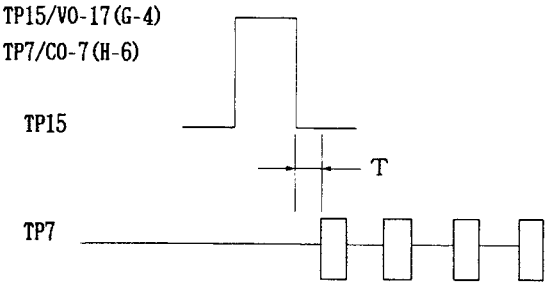
machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar · EE mode · Before adjustment, adjust the phase control and gain control of vectorscope so that the burst spots are located at 75%-burst positions.	TP208/YC-19 Vectorscope  Each color spots should be ⊞-marked positions.	◐RV31/VO-17(H-3)

11-16-5. Mix Level Adjustment

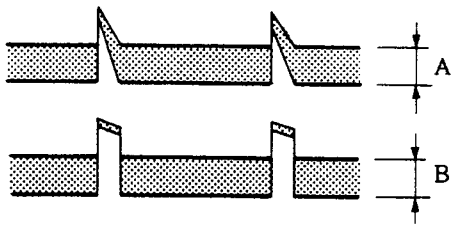
machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar · EE mode	TP102/VO-17(H-4)  A = 100% (reference) B = 50 ± 2%	◐RV30/VO-17(H-4) TRIG: TP16/CO-7(H-6)

11-17. CHROMA SYSTEM ADJUSTMENT

11-17-1. T/C Mute Pulse Width Adjustment

machine conditions for adjustment	specifications	adjustments
· Play back the pseudo color-bar segment of the alignment tape RR5-1SD PAL.	TP15/VO-17(G-4) TP7/CO-7(H-6)  T = 30 ± 10 μsec (the position between V BLK falling edge and starting point of TP7 burst)	⊘RV34/VO-17(H-4) TRIG: TP16/CO-7(H-6) SLOP (+)

11-17-2. REC 4.43MHz REF Adjustment

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar · EE mode	TP12/CO-7(G-7)  A = B	⊘LV4/CO-7(A-5)

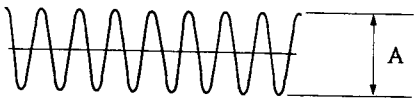
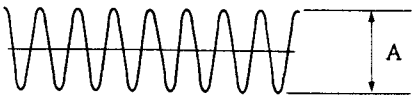
11-17-3. PB REF OSC Adjustment

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP11/CO-7(F-8) 4,433,619 ± 5 Hz	⊘RV100/CO-7(C-5)

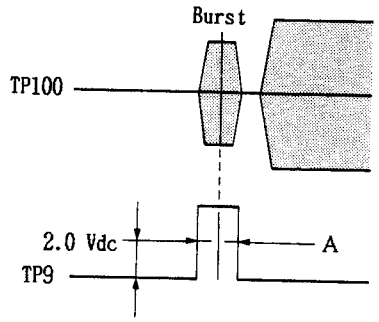
11－17－4. VCO DC Level Adjustment

machine conditions for adjustment	specifications	adjustments
Step 1. ・Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP12/CO-7(G-7) DC Level = 8.4 ± 0.1 Vdc	⊘RV103/CO-7(A-3)
Step 2. ・Play back the color-bar segment of the alignment tape RR5-2SC PAL.	TP12/CO-7(G-7) DC Level = 8.5 ± 0.1 Vdc	⊘RV104/CO-7(A-4)

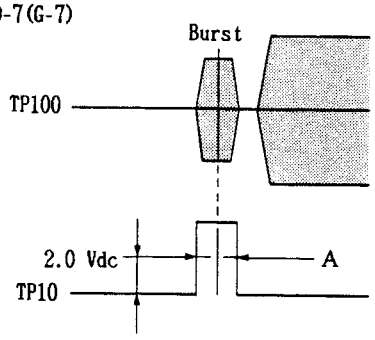
11－17－5. 5.3MHz OSC Level Adjustment

machine conditions for adjustment	specifications	adjustments
Step 1. ・Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP14/CO-7(H-5)  Adjust LV2 and LV3 alternately so that the level A is maximized.	⊘LV2/CO-7(B1-2) ⊘LV3/CO-7(B1-2)
Step 2. ・Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP14/CO-7(H-5)  A = 0.6 ± 0.03 Vp-p	⊘RV3/CO-7(C-1) TRIG: TP16/CO-7(H-6)

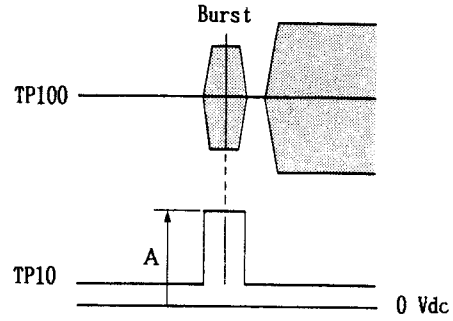
11-17-6. ACC Burst Gate Width/Phase Adjustment

machine conditions for adjustment	specifications	adjustments
Step 1. · Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP100/CO-7(H-6) TP9/CO-7(G-6)  Width: A = 2.2 ± 0.1 μs Phase: Adjust the center of both waves.	Pulse width: ●RV8/CO-7(C-7) Phase: ●RV7/CO-7(C-7) TRIG: TP2/CO-7(A-2)
Step 2. · VIDEO IN: color-bar · EE mode	Adjust the gate pulse phase as above.	●RV101/CO-7(B-6)

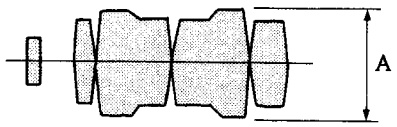
11-17-7. APC Burst Gate Width/Phase Adjustment

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP100/CO-7(H-6) TP10/CO-7(G-7)  Width: A = 2.2 ± 0.1 μs Phase: Adjust the center of both waves.	Phase: ●RV11/CO-7(C-6) Pulse width: ●RV9/CO-7(B-8) TRIG: TP2/CO-7(A-2)

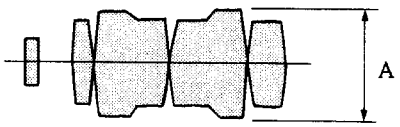
11-17-8. APC Burst Gate Level Adjustment

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP100/CO-7(H-6) TP10/CO-7(G-7)  A = 3.9 ± 0.1 Vdc	⊘RV6/CO-7(B-6) TRIG: TP2/CO-7(A-2)

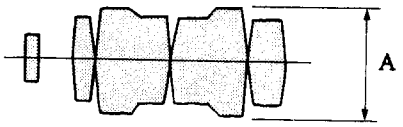
11-17-9. PB ACC Level Adjustment (High-band mode)

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-2SB PAL.	TP13/CO-7(H-5)  A = 0.8 ± 0.1 Vp-p	⊘RV21/CO-7(J-5) TRIG: TP2/CO-7(A-2)

11-17-10. PB ACC Level Adjustment (SP mode)

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP13/CO-7(H-5)  A = 0.8 ± 0.1 Vp-p	⊘RV102/CO-7(H-4) TRIG: TP2/CO-7(A-2)

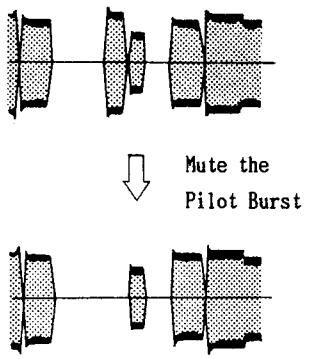
11-17-11. PB ACC Level Adjustment (Low-band mode)

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-2SC PAL.	TP13/CO-7(H-5)  A = 0.8 ± 0.1 Vp-p	⊘RV22/CO-7(J-5) TRIG: TP2/CO-7(A-2)

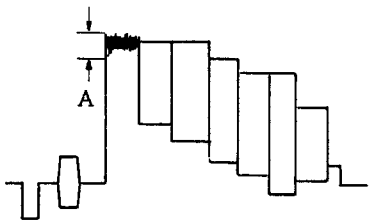
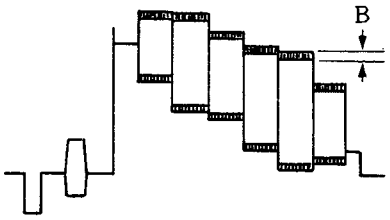
11-17-12. TBC Mode APC Adjustment

machine conditions for adjustment	specifications	adjustments
· Short between TP104/CO-7(A-7) and E1/CO-7(H-7) with a shorting clip. · TBC switch: ON · Play back the color-bar segment of the alignment tape RR5-1SD PAL. · SERCH FWD→STILL	TP12/CO-7(G-7) SERCH FWD→STILL mode 9.15 ± 0.05 Vdc (at STILL mode)	⊘RV106/CO-7(B-7)
· SERCH REV→STILL · After the adjustment is completed, remove the shorting clip.	TP12/CO-7(G-7) SERCH REV→STILL mode 7.7 ± 0.05 Vdc (at STILL mode)	⊘RV107/CO-7(B-6)

11-17-13. Pilot Burst Mute Pulse Adjustment

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL.	VIDEO OUT 1/connector panel 	⊘RV10/CO-7(C-7) TRIG: TP2/CO-7(A-2)

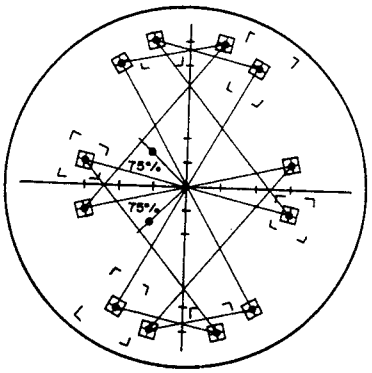
11-17-14. Converter Balance Adjustment

machine conditions for adjustment	specifications	adjustments
Step 1. · Play back the color-bar segment of the alignment tape RR5-2SB PAL.	VIDEO OUT 1/connector panel  Minimize the A level.	⊘RV18/CO-7(H-6)
Step 2. · Play back the color-bar segment of the alignment tape RR5-2SC PAL.	VIDEO OUT 1/connector panel  Minimize the B level.	⊘CT100/CO-7(H-8) TRIG: TP2/CO-7(A-2)

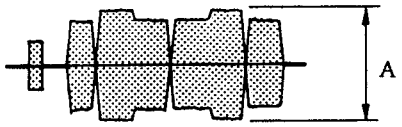
11-17-15. DG Compensator Pre-adjustment

machine conditions for adjustment	specifications	adjustments
Step 1. low band adj. · Play back the color-bar segment of the alignment tape RR5-2SC PAL.	VIDEO OUT (terminated by 75Ω) vectorscope (DG mode) A = 0	· low mode adj. ●RV23/CO-7(J-7)
Step 2. SP mode adj. · Play back the color-bar segment of the alignment tape RR5-1SD PAL.		· SP mode adj. ●RV24/CO-7(J-7)

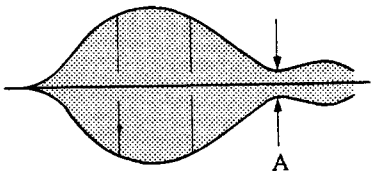
11-17-16. Y/C Mix Adjustment

machine conditions for adjustment	specifications	adjustments
Step 1. high mode adj. · Play back the color-bar segment of the alignment tape RR5-1SD PAL.	VIDEO OUT connector (terminated by 75Ω) Vectorscope  R should be located inside the ⊞.	· high mode adj. ●RV21/CO-7(J-5)
Step 2. SP mode adj. · Play back the color-bar segment of the alignment tape RR5-1SD PAL.		· SP mode adj. ●RV102/CO-7(H-4)
Step 3. low mode adj. · Play back the color-bar segment of the alignment tape RR5-2SC PAL.		· low mode adj. ●RV22/CO-7(J-5)

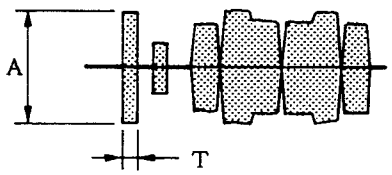
11-17-17. DUB Chroma Output Level Adjustment

machine conditions for adjustment	specifications	adjustments
· Play back the color-bar segment of the alignment tape RR5-1SD PAL.	TP6/CO-7(F-6)  A = 1.0 ± 0.1 Vp-p	◐RV13/CO-7(F-3)

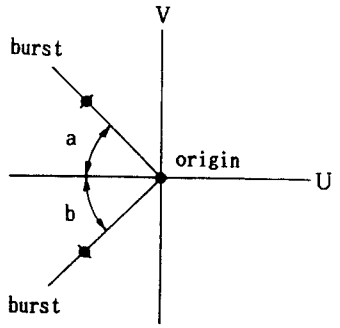
11-17-18. OA Chroma-out Frequency Response Adjustment

machine conditions for adjustment	specifications	adjustments
· REC MODE switch: LOW · VIDEO IN: gated sweep (with burst) · EE mode	TP8/CO-7(H-6)  The cross point A should be at 5.5MHz.	◐CV1/VO-17(J-1)

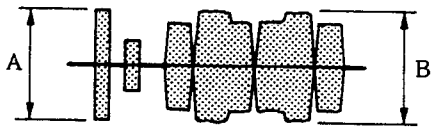
11-17-19. Pilot Burst Adjustment

machine conditions for adjustment	specifications	adjustments
· REC MODE switch: SP/HIGH · VIDEO IN: color-bar · EE mode	TP13/CO-7(H-6)  T: 3.5 ± 0.1 μs	◐RV4/CO-7(B-4) TRIG: TP2/CO-7(A-2)

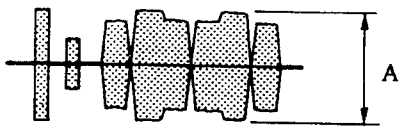
11-17-20. Pilot Burst Phase Adjustment

machine conditions for adjustment	specifications	adjustments
· REC MODE switch: SP/HIGH · VIDEO IN: color-bar · EE mode	TP13/CO-7(H-6)  a = b = 45°	●LV1/CO-7(C-2)

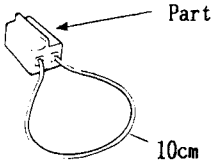
11-17-21. Pilot Burst Level Adjustment

machine conditions for adjustment	specifications	adjustments
· REC MODE switch: SP/HIGH · VIDEO IN: color-bar · EE mode	TP13/CO-7(H-6)  A = B	●RV19/CO-7(H-8) TRIG:TP2/CO-7(A-2)

11-17-22. REC Chroma RF Level Adjustment

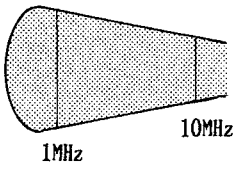
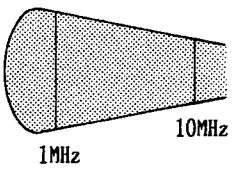
machine conditions for adjustment	specifications	adjustments
· REC MODE switch: SP/HIGH · VIDEO IN: color-bar · EE mode	TP17/CO-7(E-6)  A = 0.5 ± 0.02 Vp-p	●RV20/CO-7(H-7) TRIG: TP2/CO-7(A-2)

11-18. REC CURRENT FREQUENCY RESPONSE ADJUSTMENT

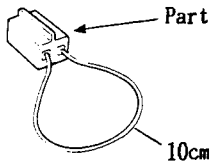


Part No. : 1-509-983-00
HUSING, IL CONNECTOR 2P
NOTE: Cut the projection with the cutter.

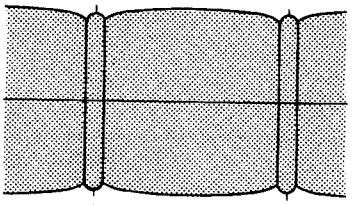
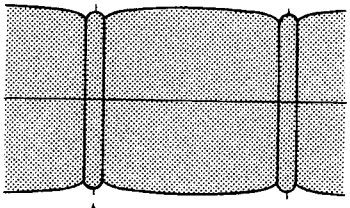
〈Junction Connector〉

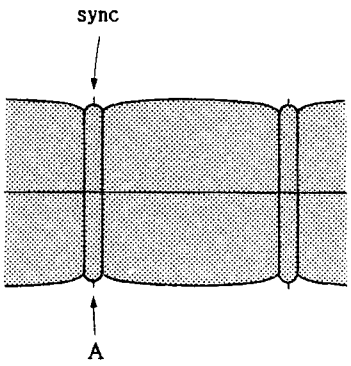
machine conditions for adjustment	specification	adjustment
· Connect the junction connector to CP1/RP-35(B-5) and CP2/RP-35 (B-5). Step 1. · Short between TP3/RP-35(B-2), TP1 /RP-35(B-2) and E1/RP-35(B-2). · Connect the RF sweep signal to TP4/RP-35(B-2). · Connect the current prove to CP1 /RP-35(B-5) and adjust SG so that 1MHz level is 60mAp-p. · EE mode	 Frequency / Level 1 MHz / 100% 10 MHz / 80± 5 % Adjust RV3 so that the 7MHz level can be meet the specification. Pay attention to change the 1MHz level when adjust RV3.	⊘RV3/RP-35(C-4)
Step 2. · Short between TP3/RP-35(B-2), TP2 /RP-35(A-2) and E1/RP-35(B-2) with shorting clips. · Connect the current prove to CP2 /RP-35(B-5) and adjust SG so that 1MHz level is 60mAp-p. · After the adjustment is completed, remove the shorting clips.	 Frequency / Level 1 MHz / 100% 10 MHz / 80± 5 %	⊘RV5/RP-35(B-4) TRIG: EXT SWEEP TRIG

11-19. REC CURRENT LEVEL ADJUSTMENT

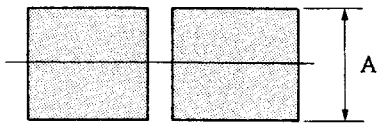


〈Junction Connector〉

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar · Short between TP2/RP-35(B-2), TP1 /RP-35(B-2) and E1/RP-35(B-2) with shorting clips.		
SP mode adj: · Insert the KSP-60 tape. · REC MODE switch: SP/HIGH · Connect the junction connector of CP1/RP-35(B-5) and then connect the current prove to it. · REC mode	sync  A A = 55 ± 5 mA	⊘RV7/RP-35(C-1)
High-band mode adj: · Insert the KCA-60 tape. · REC MODE switch: SP/HIGH · Connect the junction connector of CP1/RP-35(B-5) and then connect the current prove to it. · REC mode	sync  A A = 67 ± 8 mA	⊘RV8/RP-35(C-1)

Low-mode adj: · Insert the KCA-60 tape. · REC MODE switch: LOW · Connect the junction connector of CP1/RP-35(B-5) and then connect the current prove to it. · REC mode · After the adjustments are completed, insert the caps to CP1 and CP2, and remove the shorting clips.	 A = 60 ± 10 mA	◐RV2/RP-35(C-1)

11-20. CHROMA REC CURRENT LEVEL ADJUSTMENT

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: color-bar · REC MODE switch: SP/HIGH · Short between E1/RP-35(B-2) and TP3/RP-35(B-2) with a shorting clip. · Connect the junction connector of CP2/RP-35(B-5) and then connect the current prove to it. · Insert the KSP-60 tape. · REC mode	CP2/RP-35(B-5)  A = 16.5 ± 5 mA	◐RV1/RP-35(C-2)
· Disconnect the shorting clip. · Play back the self-recorded portion.	TP7/CO-7(H-6) Chroma level = 210 ± 10 mVp-p	

11-21. OA Y FREQUENCY RESPONSE ADJUSTMENT

11-21-1. OA Y Frequency Response Adjustment (SP mode)

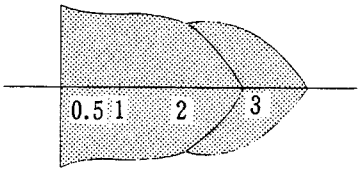
<table>
<tr><th>machine conditions for adjustment</th><th>specifications</th><th>adjustments</th></tr>
<tr>
<td>· REC MODE switch: SP/HIGH

· Insert the KSP-60 tape.

· VIDEO IN: gated sweep with burst

· REC/PB mode

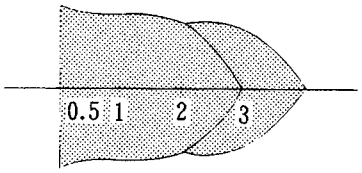
· When not to meet the specification, adjust Sec 11-19. REC Current Level Adjustment(SP mode) again.</td>
<td>VIDEO OUT 1 (terminated by 75Ω)

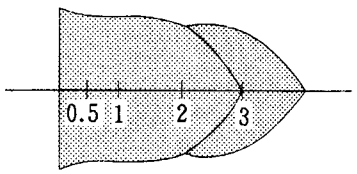
<table>
<tr><th>Frequency</th><th>Level</th></tr>
<tr><td>0.5 MHz</td><td>100%(REF)</td></tr>
<tr><td>1 MHz</td><td>100± 5 %</td></tr>
<tr><td>2 MHz</td><td>100± 5 %</td></tr>
<tr><td>3 MHz</td><td>90+10%</td></tr>
</table>

Read 2 to 3MHz level at moiré peak.</td>
<td>TRIG: TP16/CO-7(H-6)</td>
</tr>
</table>

11-21-2. OA Y Frequency Response Adjustment (High-band mode)

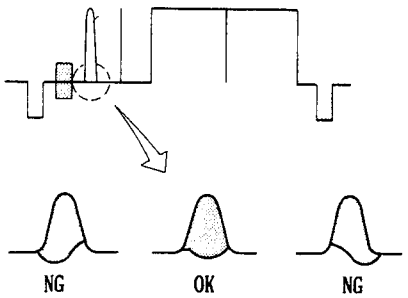
machine conditions for adjustment	specifications	adjustments
· REC MODE switch: SP/HIGH · Insert the KCA-60 tape. · VIVEO IN: gated sweep with burst · REC/PB mode · When not to meet the specification, adjust Sec. 11-19. REC Current Level Adjustment (high-band mode) again.	VIDEO OUT 1 (terminated by 75Ω)  Frequency / Level 0.5 MHz: 100%(REF) 1 MHz: 100±5 % 2 MHz: 100^{+5}_{-10} % 3 MHz: 70±10% Read 2 to 3MHz level at moiré peak.	

11-21-3. OA Y Frequency Response Adjustment (Low-band mode)

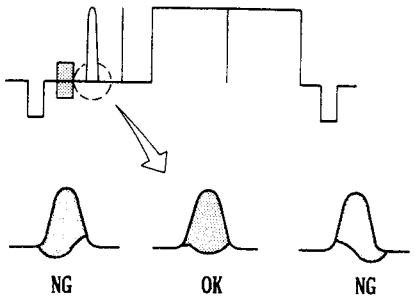
machine conditions for adjustment	specifications	adjustments
· REC MODE switch: LOW · Insert the KCA-60 tape. · VIVEO IN: gated sweep with burst · REC/PB mode · When not to meet the specification, adjust Sec. 11-19. REC Current Level Adjustment (low-band mode) again.	VIDEO OUT 1 (terminated by 75Ω)  Frequency / Level 1 MHz: 100%(REF) 2 MHz: 85±15% 3 MHz: 20±10% Read 2 to 3MHz level at moiré peak.	

11-22. PB Y/C DELAY ADJUSTMENT

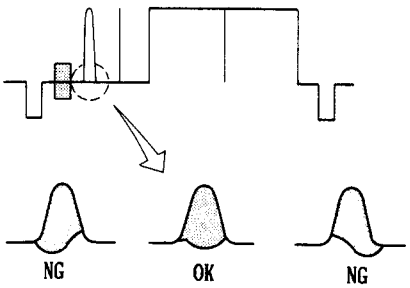
11-22-1. PB Y/C Delay Adjustment (SP mode)

machine conditions for adjustment	specifications	adjustments
· Play back the pulse & bar(color) segment of the alignment tape RR5-1SD PAL.	VIDEO OUT 1 (terminated by 75Ω)  0 ± 50 ns	◐RV25/C0-7(H-4) TRIG: TP2/C0-7(A-2)

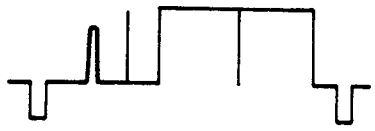
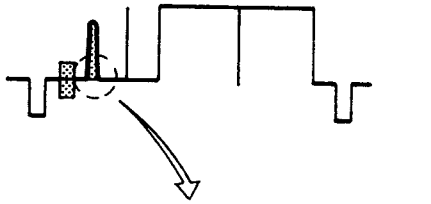
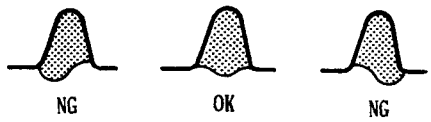
11-22-2. PB Y/C Delay Adjustment (High-band mode)

machine conditions for adjustment	specifications	adjustments
· Play back the mod 20T pulse segment of the alignment tape RR5-2SB PAL.	VIDEO OUT 1 (terminated by 75Ω)  0 ± 50 ns	⊘RV16/CO-7(G-4)

11-22-3. PB Y/C Delay Adjustment (Low-band mode)

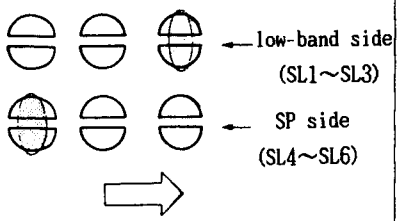
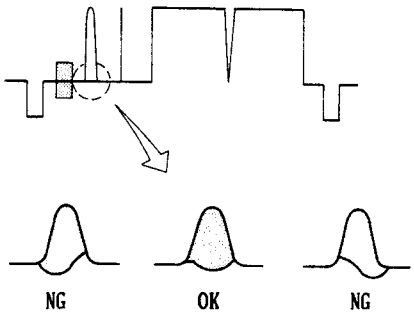
machine conditions for adjustment	specifications	adjustments
· Play back the mod 20T pulse segment of the alignment tape RR5-2SC PAL.	VIDEO OUT 1 (terminated by 75Ω)  0 ± 60 ns	⊘RV17/CO-7(G-5)

11-22-4. DUB Y/C Delay Adjustment (SP mode)

machine conditions for adjustment	specifications	adjustments
· Play back the pulse & bar segment of the alignment tape RR5-1SD PAL.	TP11/VO-17(F-8)  TP6/CO-7(F-6) ADD mode   NG OK NG 0 ± 50 ns	◐RV14/CO-7(F-4) TRIG: TP2/CO-7(A-2)

11-23. REC Y/C DELAY ADJUSTMENT

11-23-1. REC Y/C Delay Adjustment (SP mode)

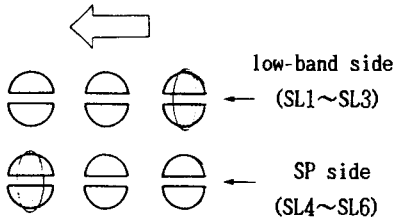
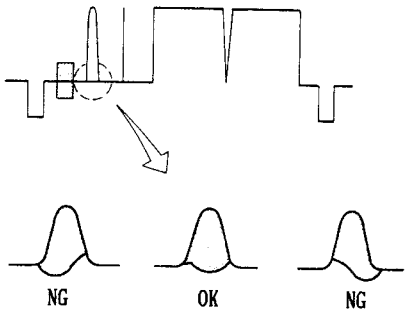
machine conditions for adjustment	specifications	adjustments
· VIDEO IN: mod 10T signal · Insert the KSP-60 tape. · REC MODE switch: SP/HIGH  ← low-band side (SL1~SL3) ← SP side (SL4~SL6) · REC/PB mode	VIDEO OUT 1 (terminated by 75Ω)  NG OK NG 0 ± 50 ns	◐SL4~SL6/CO-7(E-3) TRIG: INT

When not to meet the specification:

Remove the solder which shorts the slit of SP side on the CO-7 board by the soldering iron.

Short moving one by one in the direction of the arrow, and check to meet the specification.

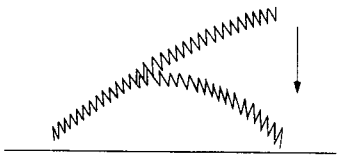
11-23-2. REC Y/C Delay Adjustment (Low-band mode)

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: mod 10T signal · Insert the KCA-60 tape. · REC MODE switch: LOW  · REC/PB mode	VIDEO OUT 1 (terminated by 75Ω)  0 ± 60 ns	◐SL1~SL3/CO-7(E-3) TRIG: INT

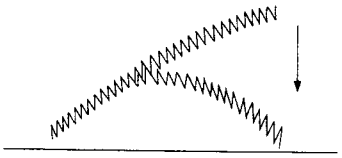
When not to meet the specification:
Remove the solder which shorts the slit of Conventional side on the CO-7 board by the soldering iron.
Short moving one by one in the direction of the arrow, and check to meet the specification.

11-24. DG COMPENSATOR ADJUSTMENT

11-24-1. DG Compensation Adjustment (SP/High mode)

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: MOD 5 STEP. · REC MODE switch: SP/HIGH · Insert the KSP-60 tape. · Play back the self recorded tape. · Observe the waveform with vectorscope.	VIDEO OUT 1 (terminated by 75Ω) Vectorscope  Flatten the right side. DG ≦ 5%	◐RV24/CO-7(J-7)

11-24-2. DG Compensation Adjustment (Low-band mode)

machine conditions for adjustment	specifications	adjustments
· VIDEO IN: MOD 5 STEP. · REC MODE switch: LOW · Insert the KCA-60 tape. · Play back the self recorded tape. · Observe the waveform with vectorscope.	VIDEO OUT 1 (terminated by 75Ω) Vectorscope  Flatten the right side. DG ≦ 7%	⊘RV23/CO-7(J-7)

U-matic SP
VIDEOCASSETTE RECORDER

VO-9600P

VOL-1

SUPPLEMENT-2

Please file this SUPPLEMENT to your MANUAL

CONTENTS;

SECTION 5 LINK AND DRIVE SYSTEM
ALIGNMENT

VO-9600P (EK)
9-966-927-82

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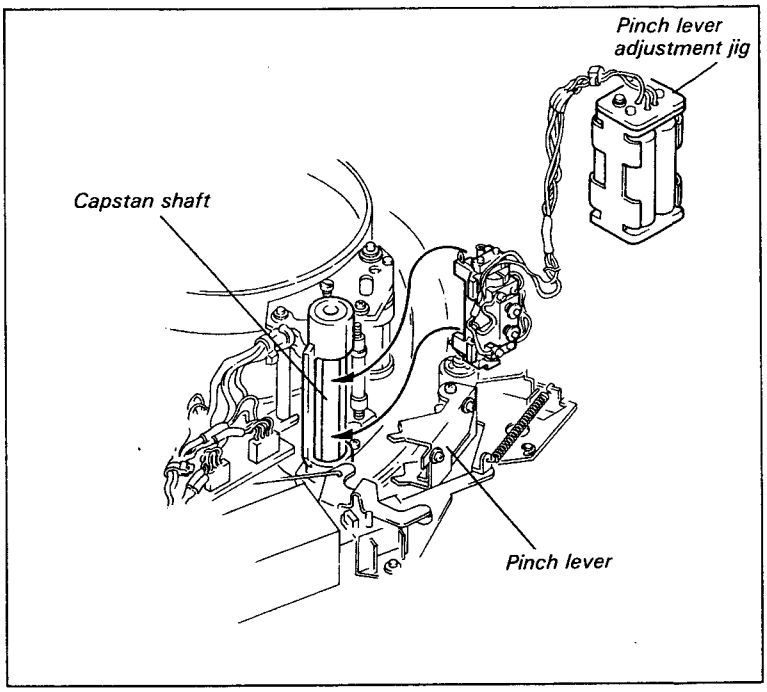
5-10. Pinch Lever Azimuth Adjustment

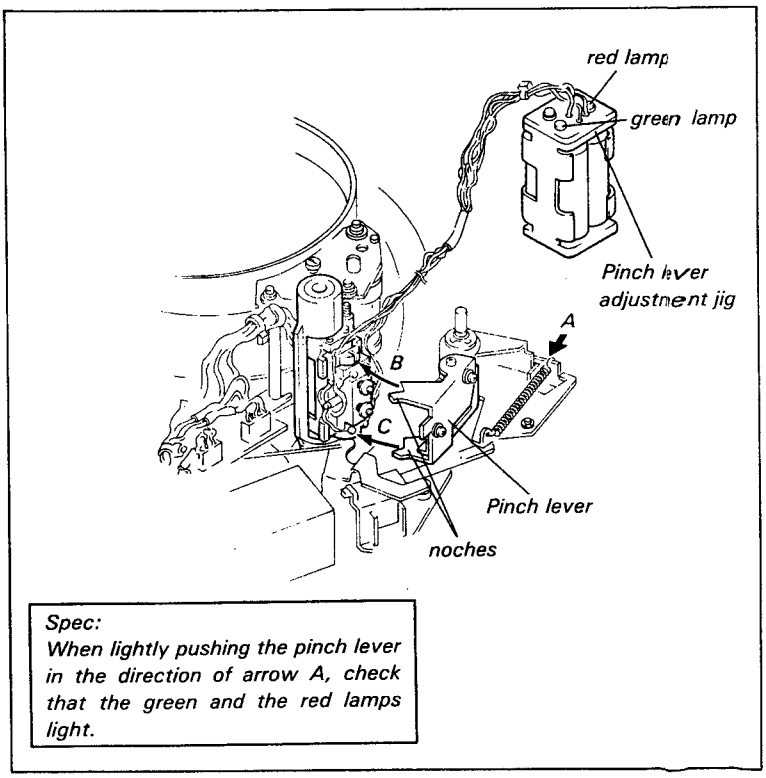
Tool: Pinch lever adjustment jig
Mode: EJECT completion mode
Check procudure:

(1) Remove the Pre-set Deck and install the pinch lever adjustment jig to the capstan shaft as shown in the figure.
(2) Push tne pinch lever in the direction of arrow A and set the notches of the pinch lever to B and C.
(3) When lightly pushing the pinch lever in the derection of arrow A, check that the green and the red lamps light.

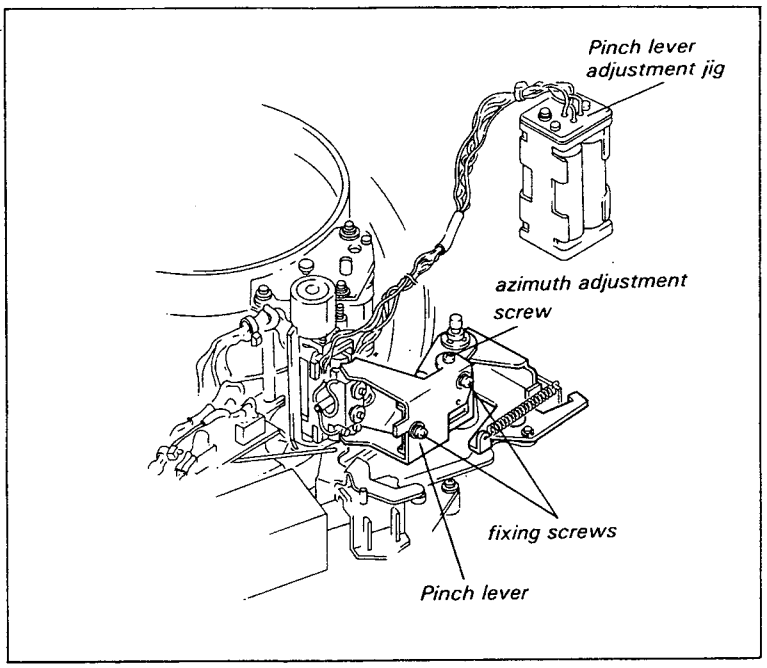
Adjustment procedure:

(1) Loosen the two fixing screws of the pinch lever and aqjust the azimuth adjustment screw to meet the required specification.
(2) After tightening the two fixing screws, check thtat the azimuth adjustment screw is thghten.
(3) Check that it meets the required specification again.





Spec:
When lightly pushing the pinch lever in the direction of arrow A, check that the green and the red lamps light.


Pinch lever
adjustment jig
azimuth adjustment
screw
fixing screws
Pinch lever